

ARS Technologies

**'USB2', 'SSI2', and 'XPRS'
families of products**

User's Guide

V 2.130

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1. Introduction

The User's Guide is organized in the following sections :

- **introduction** – chapters 1, 2 ; outlines the product lines and individual products that we have, and considerations for purchasing and using of our products
- **hardware** – chapters 3, 4, 5 ; shows the individual products in the 'USB2' , 'SSI2' and 'XPRS' - settings, connecting, powering, enclosures
- **software** – chapters 6, 7 ; describes installation of the software and utilities, with details and specifics for the ARSTech Enumerator
- **use** – chapters 8, ; shows the use of ISA, PCMCIA, PCI, PCI Express peripheral cards with our products

We recommend our customers to read :

- *introduction* - all of chapters 1, 2
- *hardware* – the specific chapter(s) for our product(s) planned to be purchased, or already purchased; this will allow to do physical installation, jumper settings, powering, putting into enclosure
- *software* – all of chapters 6, 7 , which helps in understanding the specifics of running on different operating systems, using through USB, settings for peripheral cards
- *use* - the specific chapter, based on the peripheral card used

1.1 ARS Technologies Products

ARS Technologies has 4 lines of products:

- USB1 line - discontinued
- USB2 line - active, mature
- SSI2 line - active, mainstream
- XPRS line – active, growing

Information on products based on USB1.1 interface is available in earlier versions of this document. This User's Guide deals only with the current active products.

USB2 Cards

The USB2 line of products allows using ISA and 16bit PCMCIA cards outside of computers systems through USB. It includes two families of products:

- USB2.0 to ISA cards family of products
- USB2.0 to PCMCIA card

The family of USB 2.0 to ISA cards enable connection of one or more ISA cards and use through USB. The products of the family USB 2.0 to ISA include 2 active products:

- **USB2ISA-R** – USB2.0 to ISA card, allows the use of one ISA card
- **USB2ISA-X3** – USB2.0 to ISA 3 connector card, allows use of up to 3 ISA cards

Other cards are available only on special/volume orders:

- **USB2ISA-RA** – USB2.0 to ISA right angle card, allows the use of one ISA card
- **USB2ISA-SL** - USB2.0 to ISA slot version card, requires a separate passive ISA back plane where it is installed, and allows the use of number of ISA cards, depending on the number of ISA connectors on the back plane
- **USB2ISA-X7** – USB2.0 to ISA 7 connector card, allows the use of up to 7 ISA cards

The USB 2.0 to PCMCIA card enables connection of a PCMCIA card and use through USB. It is available only on special/volume orders. The products of the USB2.0 to PCMCIA family includes:

USB2PCMCIA-R – USB2.0 to PCMCIA card, allows the use of one 16bit PCMCIA card

SSI2 Cards

The SSI2 line of products allows use of PCI, ISA and 16/32bit PCMCIA cards outside of computers systems, through cable.

The SSI2 products are multi-interface products which connect with:

- SSI2 host cards
- standard USB2 hosts

The SSI2 products include:

- **SSI2 ISA** family - allow the use of one or 3 ISA cards
- **SSI2 PCI** family - allows the use of one or 3 PCI cards
- **SSI2 PCMCIA** - allows the use of one 16/32bit PCMCIA card

The SSI2 Host side products include:

- **SSI2 HostPCI** – mounted in a PCI slot of a desktop computer
- **SSI2 HostCB** – mounted in a CardBus slot of a notebook computer

XPRS Cards

The XPRS line of products allows use of PCI, PCI Express, ExpressCard, and 32bit PCMCIA cards outside of computers systems, through cable.

There are 2 type of XPRS products:

- host cards – mounted on a desktop system, or on a notebook system with
- and peripheral cards – handling PCI, PCI Express, ExpressCard, and 32bit PCMCIA cards

Based on the computer system there are the following host cards:

- [xprs-host-dt](#) for a PCI Express desktop system
- or, [xprs-host-ec](#) for a notebook system with an ExpressCard slot

There are the following **XPRS** peripheral cards:

- [xprs-px-x1](#) with a PCI Express X1 card
- [xprs-px-x16](#) with a PCI Express X16 card
- [xprs-pci-x1](#) with a PCI card
- [xprs-cb](#) with a PCMCIA CardBus card
- [xprs-ec](#) with an ExpressCard card

1.2 Software

Supported Platforms

The platforms that ARS Technologies' cards work on are:

- Windows
- Linux
- Mac OS X

The Windows platform includes support on - Windows 98, Windows ME, Windows 2000, Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, and Windows 7.

The Linux platform includes support on 2.6.xx kernels, 32bit and 64bit releases.

The Mac OS platform includes support for Mac OS X 10.5 and 10.6 releases.

Software Utility, and basic API set

There is one utility included within the installation software that give the user manual access to the physical memory and I/O space of the ISA, PCI and PCMCIA cards

- **arsgui** - graphical user interface program

The installation software includes a folder with a description of our simple/basic API set and samples for software developers dealing with peripheral cards.

1.3 Customers

We offer our products to two groups of customers:

- **Manufacturers** of ISA, PCI, or PCMCIA cards. Manufactures have the source code of the software for their cards. They can use our **ArsGui** utility to manually access the hardware on the peripheral card, then our basic simple API set to develop programs. Or they can use the API set and samples in our **SDKBUS** kit to convert their software to work our USB2.0 products, or the SSI2 products. For more information, please visit :
www.arstech.com/SDKBUS.htm
- **End users** who do not have the source code, but just the binaries of an ISA, PCI or PCMCIA card they use. End users can use our universal software layer (USL) option with the original software of the card. The USL is included in the installation software. There is a detailed description on the purpose, set-up and use of the universal software layer in the following chapters.

2. Considerations before and after purchase

This chapter provides considerations on selecting of our products.

If you have selected, purchased and use the ideal set of products – congratulations!

In all the other cases you may need to revisit multiple times this chapter before and after purchasing of our products.

2.1 Hardware considerations

XPRS or SSI2 / USB2 ?

XPRS line of products allows handling of peripheral cards in a way like they are attached directly to the computer system.

If you have a high data throughput peripheral card we strongly recommend using XPRS line of products.

The USB interface is present / available on almost all systems and supported in our USB2 and SSI2 product lines, however is not similar to the interfaces of the peripheral cards. We recommend testing/evaluating first with 1 set of – product/enclosure/power supply/cable .

Single card or multiple cards ?

All of our product lines have products supporting a single peripheral card, or up to 3 peripheral cards .

If having multiple cards not similar to each other, we recommend mounting/testing with one peripheral card at a time.

Choosing of powering of a peripheral card

An ISA card may use:

- either +5V only
- or +5V, and any combination of +12V, -5V and -12V

A PCI card may use:

- either +5V only
- or +3.3V only
- or +5V and any combination of +12V and -12V
- or +3.3V and any combination of +12V and -12V

A 16bit PCMCIA card may use:

- either +5V only
- or +3.3V only

A 32bit PCMCIA card uses

- +3.3V only

A PCI Express card may use:

- either +3.3V only
- or +3.3V and +12V

A ExpressCard card may use:

- +3.3V only
- or +3.3V and +1.5V

Regarding the voltages used by peripheral cards, please check our articles in the 'Knowledge Base' section - http://www.arstech.com/page--ste_whitepapers.html

All of product our lines provide power through the cable – some peripheral cards may be powered/handled in this way.

ARS Technologies offers the following power supply options for ISA and PCI peripheral cards:

- **isa-pwr-** [Power-supply-module-isapwr.html](#)
- **isa-pwr-xr-** [External-Power-Supply-25W-ROHS](#)

ARS Technologies offers the following power supply options for PCI, PCMCIA and PCI Express peripheral cards:

- **pwr-3v** - [3.3V Power-supply](#)
- **pwr-5v, -eu, -uk** - [5V Power-Supply](#)

The **currents** consumed by the different voltages may vary from several mA to several A .

The **voltages** used by a particular card are available in the documentation/specifications sheet for that particular card. When using multiple cards, please add the currents for a particular voltage to get the total current consumed.

Choosing an enclosure for ISA, PCI and PCI Express cards

If you have a single ISA, PCI or PCI Express card, you can choose between:

- [Enclosure-for-1-ISA-PCI-card](#)
- [Enclosure-Double-length-for-1-ISA-PCI-card](#)

If you have multiple ISA, PCI or PCI Express cards, you can choose between:

- [Enclosure-for-3-ISA-PCI-cards-isax3b1.html](#)
- [Enclosure-Double-length-for-3-ISA-PCI-cards](#)

The above web pages offer:

- the enclosure **images**
- the **maximum dimensions** of an ISA, PCI or PCI Express card which can fit into the enclosure
- **assembly instructions** for the enclosure and the peripheral card

2.2 Software Considerations

Different operating systems

Software written for one operating system may or may not work on other operating systems.

ARS Technologies recommends finding software packages for the same hardware- i.e. ISA, PCI, PCMCIA cards- for different operating system, and testing on the particular operating system where you want to use the peripheral card.

Virtualization

Current solutions for virtualized operating systems are good for application / user level software, however may be having problems with drivers / kernel level software and special hardware.

If a test with our products on virtualized operating system, an option may be to test on current os which is not virtualized.

Resources detection

Some peripheral cards like PCI, PCMCIA and Plug and Play (PNP) ISA cards can be detected by our software and can provide their resources.

Other cards, like non PNP ISA cards can be scanned by our software and the detected resources reported.

There may be a need to manually add resources which were not automatically detected by ARS Technologies' installation software.

ISA card handling

Peripheral cards like PCI, PCI Express, PCMCIA and Plug and Play (PNP) ISA cards can be detected by our software and the associated drivers automatically loaded.

The ISA software can include -

- 16bit DOS type
- 32bit windows 98 direct i/o type
- 32bit driver - no .inf file
- 32bit driver - with .inf file

Adjustments

You can view ARS Technologies' warranty/refund store policies at:

http://www.arstech.com/page--ste_storepolicies.html

You can consider a number of solutions, until you find the most suitable option-peripheral solution card, power supply, enclosure and/or cable.

If our product from one line does not work with a peripheral card, you can consider testing with a product from another line which handles the same type of a peripheral card.

3. USB2 product line

The chapter describes each individual card and the ways of powering, placing it in an enclosure and connecting the card.

3.1 [USB2ISA-R card](#)

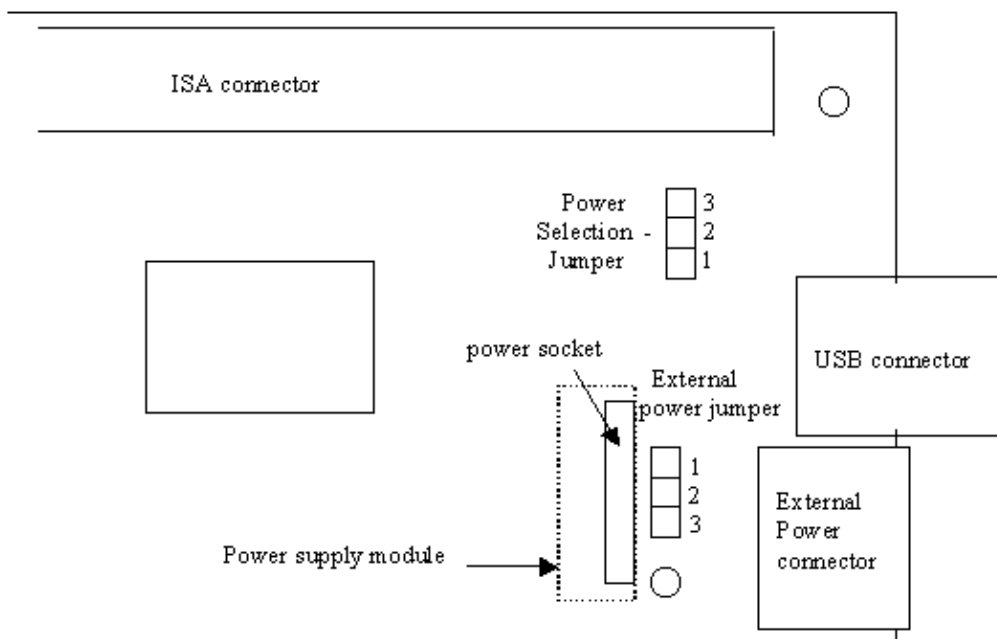


Image of USB2ISA-R

The USB 2.0 to ISA (USB2ISA-R) card works with one ISA card.

Step 1 - Powering considerations

There are 3 possible choices for powering an ISA card mounted on an USB2ISA-R:

- using the power provided through the USB cable- if the ISA card needs only +5V and the power consumption is within 500mA.

- using an **isa-pwr-** in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed by an ISA card are within 50mA.
- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.

To find out if a particular ISA card needs additional voltages please read the article located at:

<http://www.arstech.com/page--pwrsupplyneeds.html> .

To find the currents consumed, please check the documentation of the particular ISA card in use.

ARS Technologies offers the following powering options:

- **isa-pwr-** [Power-supply-module](#)
- **isa-pwr-xr-** [External-Power-Supply-25W-ROHS](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the USB 2.0 to ISA card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available ISA cards - using **isa-pwr-xr** external power supply to power ISA cards.

The **USB2ISA-R** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the USB 2.0 to ISA card without an ISA card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the USB2ISA-R card is powered properly.

After mounting an ISA card in the USB 2.0 to ISA card, check in our Enumerator for connect/disconnect events to make sure certain that the USB2ISA-R card is powered

properly.

The power selection jumper has two options:

(Please reference the USB2ISA-R image in section 3.1 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 1. ISA card using only +5V; there is limit of 500 mA current consumption from +5V
 2. **isa-pwr** power supply module connected providing -5V, +12V or -12V to the ISA card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the option:

The power comes from an external power supply in the power socket (**isa-pwr-xr**) adapters; there are +5V, +12V, -12V or -5V going to the ISA card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:

2-3 – (default) power provided by the **isa-pwr-xr**

Step 2 (optional) – Place USB2ISA-R card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the ISA card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an ISA card and are using the **USB2ISA-R** you can choose between two enclosure options:

- [Enclosure-for-1-ISA-PCI-card](#)
- [Enclosure-Double-length-for-1-ISA-PCI-card](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

3.2 USB2ISA-X3 card

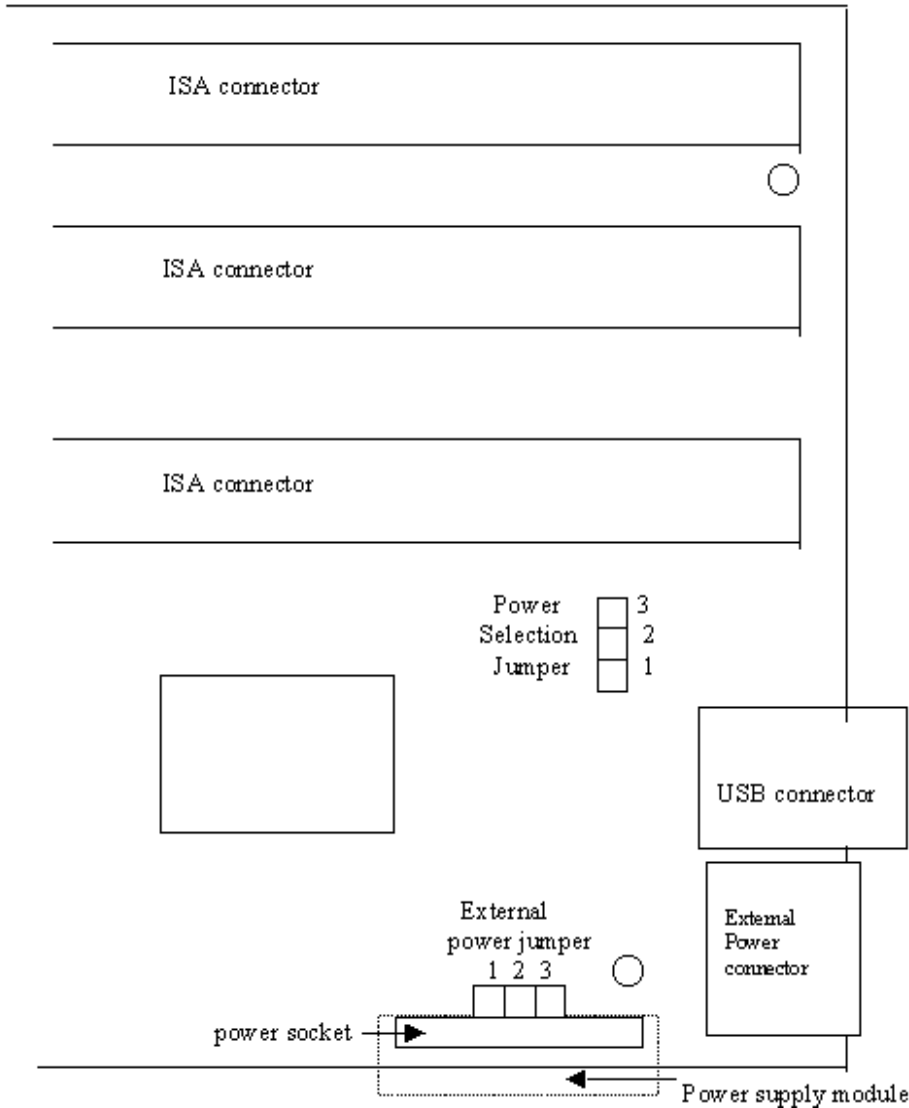


Image of USB2ISA-X3

The USB 2.0 to ISA Three Connector (USB2ISA-X3) card works with up to three ISA cards.

Step 1 - Powering considerations

There are 3 possible choices for powering an ISA card mounted on an USB2ISA-X3:

- using the power provided through the USB cable- if the ISA card needs only +5V and the power consumption is within 500mA.

- using an **isa-pwr-** in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed by an ISA card are within 50mA.
- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.

To find out if a particular ISA card needs additional voltages please read the article located at:

<http://www.arstech.com/page--pwrsupplyneeds.html> .

To find the currents consumed, please check the documentation of the particular ISA card in use.

ARS Technologies offers the following powering options:

- **isa-pwr-** [Power-supply-module](#)
- **isa-pwr-xr-** [External-Power-Supply-25W-ROHS](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the USB 2.0 to ISA card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available ISA cards - using **isa-pwr-xr** external power supply to power ISA cards.

The **USB2ISA-X3** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the USB 2.0 to ISA card without an ISA card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the USB2ISA-X3 card is powered properly.

After mounting an ISA card in the USB 2.0 to ISA card, check in our Enumerator for connect/disconnect events to make sure certain that the USB2ISA-X3 card is powered properly.

The power selection jumper has two options:

(Please reference the USB2ISA-X3 image in section 3.2 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 3. ISA card using only +5V; there is limit of 500 mA current consumption from +5V
 4. **isa-pwr** power supply module connected providing –5V, +12V or -12V to the ISA card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the option:

The power comes from an external power supply in the power socket (**isa-pwr-xr**) adapters; there are +5V, +12V, -12V or -5V going to the ISA card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:

2-3 – (default) power provided by the **isa-pwr-xr**

Step 2 (optional) – Place USB2ISA-X3 card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the ISA card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an ISA card and are using the **USB2ISA-X3** you can choose between two enclosure options:

- [Enclosure-for-3-ISA-PCI-cards](#)
- [Enclosure-Double-length-for-3-ISA-PCI-cards](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

3.3 Other USB2 cards

ARS Technologies did previously offer also the following products:

- USB2ISA-RA – takes one ISA card, mounted horizontally
- USB2ISA-SL – takes multiple ISA cards, mounted in a passive ISA backplane
- USB2ISA-X7 – takes up to 7 ISA cards
- USB2PCMCIA-R – takes one 3.3V or 5V 16bit PCMCIA card

You can initially evaluate with our regular – similar / comparable products, and contact us if you want to get a specific one of the above products.

4. SSI2 Product Line

This chapter describes the SSI2 product line; each individual card; the ways of powering the cards; and how to place the card in an enclosure and connect it to a power source.

4.1 [SSI2 ISA card](#)

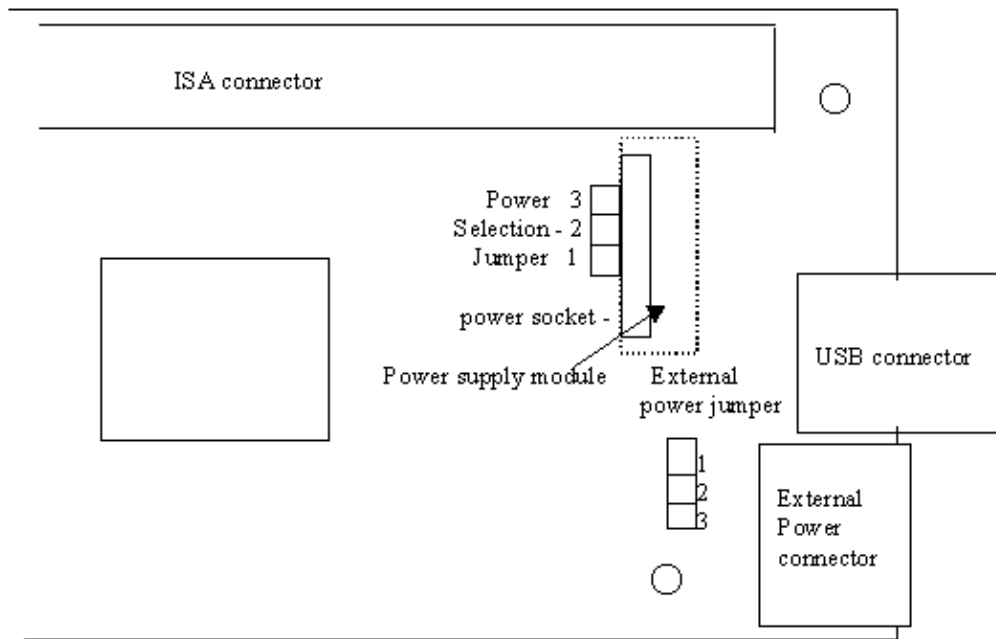


Image of SSI2 ISA

The SSI2 ISA card allows the work with one ISA card.

Step 1 - Powering considerations

There are 3 possible choices for powering an ISA card mounted on a SSI2 ISA:

- using the power provided through the USB cable- if the ISA card needs only +5V and the power consumption is within 500mA.
- using an **isa-pwr**- in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed

by an ISA card are within 50mA.

- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.

To find out if a particular ISA card needs additional voltages please read the article located at:

<http://www.arstech.com/page--pwrsupplyneeds.html> .

To find the currents consumed, please check the documentation of the particular ISA card in use.

ARS Technologies offers the following powering options:

- **isa-pwr**- [Power-supply-module](#)
- **isa-pwr-xr**- [External-Power-Supply-25W-ROHS](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the SSI2 ISA card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available ISA cards - using **isa-pwr-xr** external power supply to power ISA cards.

The **SSI2 ISA** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the SSI2 ISA card without an ISA card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the SSI2 ISA card is powered properly.

After mounting an ISA card in the SSI2 ISA card, check in our Enumerator for connect/disconnect events to make sure certain that the SSI2 ISA card is powered properly.

The power selection jumper has two options:

(Please reference the SSI2 ISA image in section 4.1 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 - ISA card using only +5V; there is limit of 500 mA current consumption from +5V
 - **isa-pwr** power supply module connected providing –5V, +12V or -12V to the ISA card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the option:
 - The power comes from an external power supply in the power socket (**isa-pwr-xr**) adapters; there are +5V, +12V, -12V or -5V going to the ISA card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:

2-3 – (default) power provided by the **isa-pwr-xr**

Step 2 (optional) – Place SSI2 ISA card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the ISA card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an ISA card and are using the **SSI2 ISA** you can choose between two enclosure options:

- [Enclosure-for-1-ISA-PCI-card](#)
- [Enclosure-Double-length-for-1-ISA-PCI-card](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

4.2 SSI2 PCI card

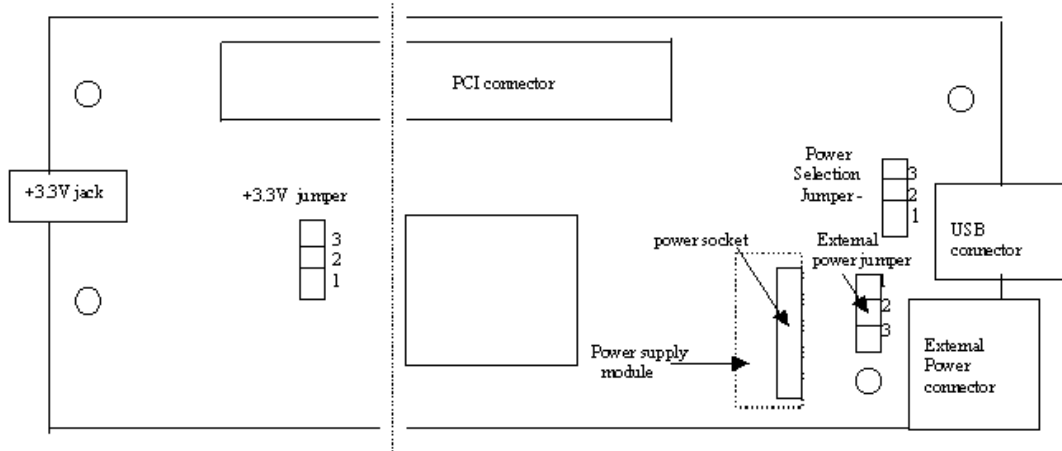


Image of SSI2 PCI

The SSI2 PCI card works with one PCI card.

Step 1 - Powering considerations

There are 4 possible choices for powering a PCI card mounted on a SSI2 PCI:

- using the power provided through the USB cable- if the PCI card needs only +5V and the power consumption is within 500mA.
- using an **isa-pwr-** in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed by an ISA card are within 50mA.
- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.
- using of an external power supply (**pwr-3v**) adapter to provide +3.3v when currents consumed by the PCI card are within the limits of the external power adapter.

To find the voltages used and currents consumed, please check the documentation of the particular PCI card in use.

ARS Technologies offers the following powering options:

- **isa-pwr**- [Power-supply-module](#)
- **isa-pwr-xr**- [External-Power-Supply-25W-ROHS](#)
- **pwr-3v** - [External-Power-Supply-3V](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the SSI2 PCI card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available PCI cards - using **isa-pwr-xr** external power supply to power PCI cards.

The **SSI2 PCI** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the SSI2 PCI card without a PCI card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the SSI2 PCI card is powered properly.

After mounting a PCI card in the SSI2 PCI card, check in our Enumerator for connect/disconnect events to make sure certain that the SSI2 PCI card is powered properly.

The power selection jumper has two options:

(Please reference the SSI2 PCI image in section 4.2 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 - PCI card using only +5V; there is limit of 500 mA current consumption from +5V
 - **isa-pwr** power supply module connected providing -5V, +12V or -12V to the PCI card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the options:
 - The power comes from an external power supply (**isa-pwr-xr**) adapters; externally, there are +5V, +12V and -12V going to the PCI card; the limit of current consumption depends on the external power supply
 - The power comes from an external power supply (i.e. **pwr-3v**) adapters; externally, there is +3.3V going to the PCI card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:

2-3 – (default) power provided by the **isa-pwr-xr**

The +3.3V jumper has two powering options:

- 1-2 (default) - +3.3V power provided for the PCI card by other sources; including the USB cable, floppy connector or external power supplies
- 2-3 - +3.3V power provided for the PCI card by the **pwr-3v**

Step 2 (optional) – Place SSI2 PCI card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the PCI card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an PCI card and are using the **SSI2 PCI** you can choose between two enclosure options:

- [Enclosure-for-1-ISA-PCI-card](#)
- [Enclosure-Double-length-for-1-ISA-PCI-card](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

4.3 SSI2 ISA X3 card

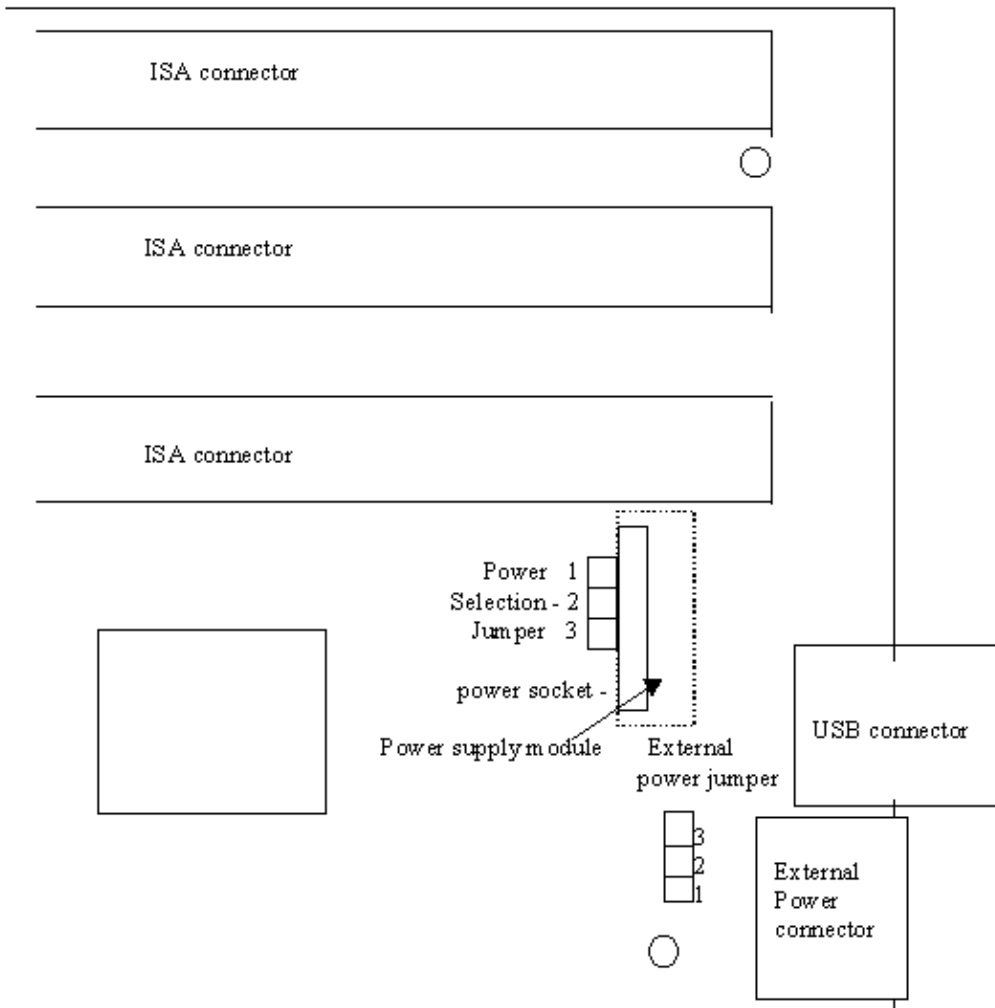


Image of SSI2 ISA X3

The SSI2 ISA X3 card allows the work with up to 3 ISA cards.

Step 1 - Powering considerations

There are 3 possible choices for powering an ISA card mounted on a SSI2 ISA X3:

- using the power provided through the USB cable- if the ISA card needs only +5V and the power consumption is within 500mA.

- using an **isa-pwr-** in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed by an ISA card are within 50mA.
- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.

To find out if a particular ISA card needs additional voltages please read the article located at:

<http://www.arstech.com/page--pwrsupplyneeds.html> .

To find the currents consumed, please check the documentation of the particular ISA card in use.

ARS Technologies offers the following powering options:

- **isa-pwr-** [Power-supply-module](#)
- **isa-pwr-xr-** [External-Power-Supply-25W-ROHS](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the SSI2 ISA X3 card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available ISA cards - using **isa-pwr-xr** external power supply to power ISA cards.

The **SSI2 ISA X3** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the SSI2 ISA X3 card without an ISA card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the SSI2 ISA X3 card is powered properly.

After mounting an ISA card in the SSI2 ISA X3 card, check in our Enumerator for connect/disconnect events to make sure certain that the SSI2 ISA X3 card is powered properly.

The power selection jumper has two options:

(Please reference the SSI2 ISA X3 image in section 4.3 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 - ISA card using only +5V; there is limit of 500 mA current consumption from +5V
 - **isa-pwr** power supply module connected providing –5V, +12V or -12V to the ISA card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the option:
 - The power comes from an external power supply in the power socket (**isa-pwr-xr**) adapters; there are +5V, +12V, -12V or -5V going to the ISA card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:
2-3 – (default) power provided by the **isa-pwr-xr**

Step 2 (optional) – Place SSI2 ISA X3 card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the ISA card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an ISA card and are using the **SSI2 ISA X3** you can choose between two enclosure options:

- [Enclosure-for-3-ISA-PCI-cards-isax3b1.html](#)
- [Enclosure-Dbl-length-for-3-ISA-PCI-cards-isax3b2.html](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

4.4 SSI2 PCI X3 card

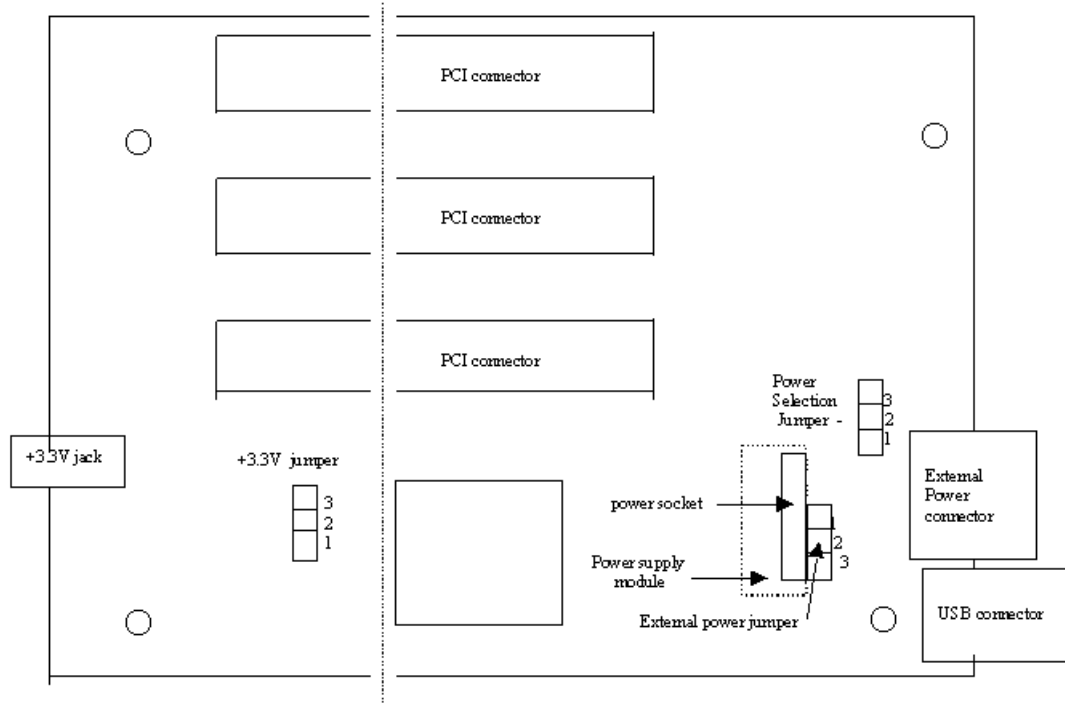


Image of SSI2 PCI X3

The SSI2 PCI X3 card works with up to 3 PCI cards.

Step 1 - Powering considerations

There are 4 possible choices for powering a PCI card mounted on a SSI2 PCI X3:

- using the power provided through the USB cable- if the PCI card needs only +5V and the power consumption is within 500mA.
- using an **isa-pwr-** in addition to the +5V coming through the USB cable, the power supply module provides +12V, -12V and -5V when currents consumed by an ISA card are within 50mA.
- using an external power supply (**isa-pwr-xr**) adapters to provide +5v, +12V, -12V and -5V when currents consumed by an ISA within the limits of the particular external power adapter.
- using of an external power supply (**pwr-3v**) adapter to provide +3.3v when currents consumed by the PCI card are within the limits of the external power adapter.

To find the voltages used and currents consumed, please check the documentation of the particular PCI card in use.

ARS Technologies offers the following powering options:

- **isa-pwr-** [Power-supply-module](#)
- **isa-pwr-xr-** [External-Power-Supply-25W-ROHS](#)
- **pwr-3v** - [External-Power-Supply-3V](#)

If you want to use the **isa-pwr** (power supply module), it has to be mounted on the power supply socket .

If you want to use the **isa-pwr-xr** (external power supply), the SSI2 PCI X3 card will not work until the external power is turned on.

To assist with choosing a powering option, ARS Technologies offers a universal choice, which can cover most available PCI cards - using **isa-pwr-xr** external power supply to power PCI cards.

The **SSI2 PCI X3** board has a light emitting diode (LED) which indicates when there is power supplied or not. When there is power, the LED is on, when there is no power, the LED is off.

ARS Technologies recommends first connecting the SSI2 PCI X3 card without a PCI card mounted and then checking in our Enumerator for connect/disconnect events in order to make certain that the SSI2 PCI X3 card is powered properly.

After mounting a PCI card in the SSI2 PCI X3 card, check in our Enumerator for connect/disconnect events to make sure certain that the SSI2 PCI X3 card is powered properly.

The power selection jumper has two options:

(Please reference the SSI2 PCI X3 image in section 4.4 to change jumper position)

Option 1: 1-2 Position (default)

- 1-2 (default) - power provided by the USB cable; this choice has 2 options:
 - PCI card using only +5V; there is limit of 500 mA current consumption from +5V
 - **isa-pwr** power supply module connected providing –5V, +12V or -12V to the PCI card; the card consumes currents within the powering limitations.

Option 2: 2-3 Position

- 2-3 - power provided by an external power source; this choice has the options:
 - The power comes from an external power supply (**isa-pwr-xr**) adapters; externally, there are +5V, +12V and -12V going to the PCI card; the limit of current consumption depends on the external power supply
 - The power comes from an external power supply (i.e. **pwr-3v**) adapters; externally, there is +3.3V going to the PCI card; the limit of current consumption depends on the external power supply

External Jumper Powering Options

The external power jumper is placed in permanent position:

2-3 – (default) power provided by the **isa-pwr-xr**

The +3.3V jumper has two powering options:

- 1-2 (default) - +3.3V power provided for the PCI card by other sources; including the USB cable, floppy connector or external power supplies
- 2-3 - +3.3V power provided for the PCI card by the **pwr-3v**

Step 2 (optional) – Place SSI2 PCI X3 card into an enclosure

ARS Technologies offers single and double length plastic enclosures. You will need to measure the PCI card you have and select the appropriate single or double length plastic enclosure for your card.

If you have an PCI card and are using the **SSI2 PCI X3** you can choose between two enclosure options:

- [Enclosure-for-3-ISA-PCI-cards-isax3b1.html](#)
- [Enclosure-Dbl-length-for-3-ISA-PCI-cards-isax3b2.html](#)

The above web pages offer:

- enclosure **images**
- **maximum dimensions** of an ISA card which can fit into the enclosure
- assembly instructions for the enclosure and the peripheral card

4.5 SSI2 PCMCIA card

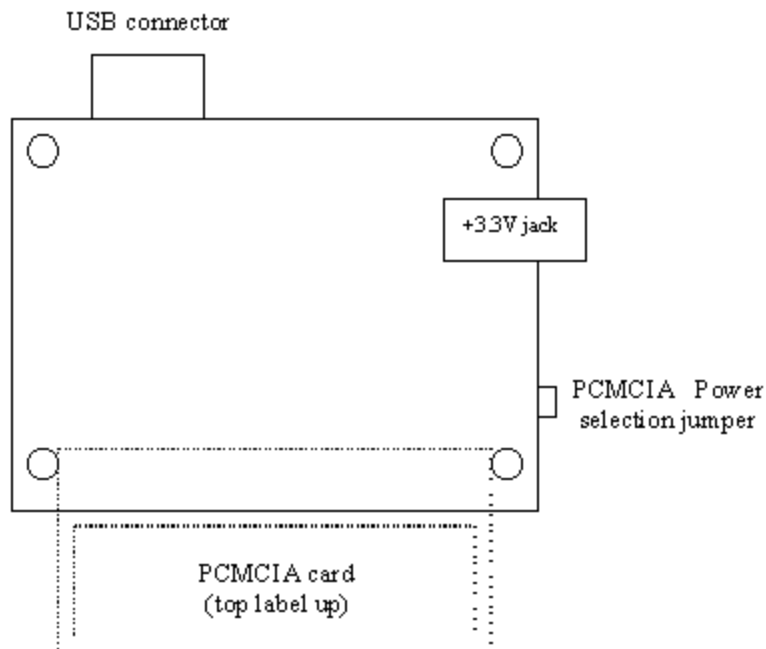


Image of SSI2 PCMCIA

The SSI2 PCMCIA card works with one 16bit 'PC Card' type of PCMCIA card, or one 32bit 'Card Bus' type of a PCMCIA card.

Only +3.3V PCMCIA cards are supported.

Step 1 - Powering considerations

There is a PCMCIA power selection jumper and a +3.3V power jack on the SSI2 PCMCIA card, which permits selection of different sources of +3.3V as a V_{pp} voltage to the PCMCIA card.

There are two possible choices of powering on an SSI2 PCMCIA card:

- using the power provided through the USB cable, if the PCMCIA card consumes up to 500mA of current
- using the **pwr-3v** adapter, which will provide up to 2A of current for the PCMCIA card

The power selection jumper has two choices:

- closed (default) – provides +3.3V as Vpp power to the PCMCIA card through the USB cable
- open – provides +3.3V as Vpp to the PCMCIA card using the **pwr-3v** adapter

To find out the voltage and current consumed, check the documentation/specifications sheet of the particular PCMCIA card.

ARS Technologies offers the **pwr-3v** to power the SSI2 PCMCIA card. You can find more info about the pwr-3v at:

- External-Power-Supply-3V-pwr3v.html

Step 2 – Mounting

The **SSI2 PCMCIA** card comes with an enclosure.

In general one PCMCIA card has a top side and a bottom side. Ideally, when connected to SSI2 PCMCIA card, the top side will be up, and the bottom side will face down.

Mount the PCMCIA card to the SSI2 PCMCIA card as indicated in the figure located in section 4.5.

Step 3 – Connecting

The PCMCIA card has to be mounted in **SSI2 PCMCIA** before connecting to SSI2 host.

Change the jumper settings according to the current (amperage needs) of the PCMCIA card.

If you want to use the SSI2 PCMCIA card with an external power source:

1. Connect the power source
2. Turn the power on
3. Connect the **SSI2 PCMCIA** card to the SSI2 host

The SSI2 PCMCIA card will not work until the external power is turned on.

We recommend connecting initially the SSI2 PCMCIA card without a PCMCIA card mounted and checking in our Enumerator for connect/disconnect events in order to ensure the proper powering.

After mounting a PCMCIA card in the SSI2 PCMCIA card, check in our Enumerator for connect/disconnect events, in order to ensure proper powering once again.

4.6 SSI2 Host PCI card

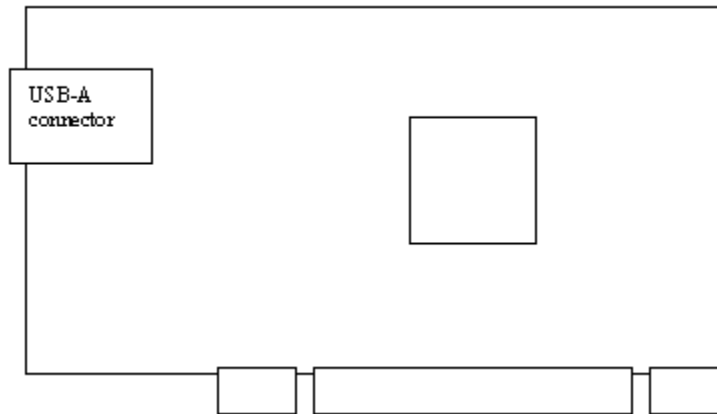


Image of SSI2 Host PCI

The SSI2 Host PCI card is mounted on a PCI slot in a Desktop computer and allows the work with:

- ISA cards mounted on an SSI2 ISA
- PCI cards mounted on an SSI2 PCI
- PCMCIA cards mounted on an SSI2 PCMCIA

Step 1 - Powering considerations

The SSI2 Host PCI card is powered through the PCI slot in a Desktop computer. There is no need of additional powering.

Step 2 - Mounting

The SSI2 Host PCI card is mounted on a PCI slot inside of a Desktop computer. There is no need of additional enclosure.

Step 3 - Connecting

ARS Technologies recommends after first installing the SSI2 Host PCI card, check in our Enumerator for the presence of the SSI2 Host PCI in order to ensure proper mounting.

Check in our Enumerator for connect/disconnect events of SSI2 ISA, SSI2 PCI and SSI2 PCMCIA cards as well..

4.7 SSI2 Host CB card

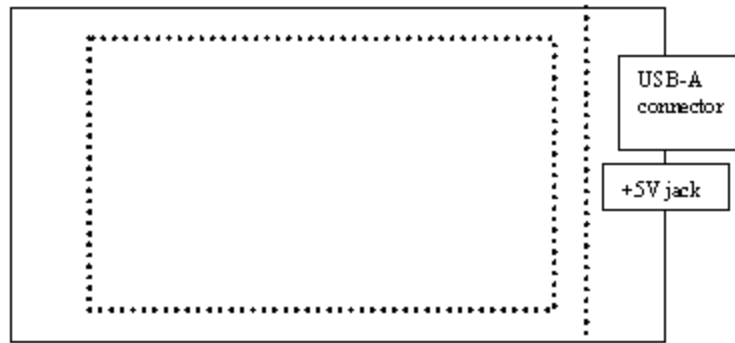


Image of SSI2 Host CB

The SSI2 Host CB card is mounted on a 'Card Bus' slot in a Notebook computer and permits work with:

- ISA cards mounted on SSI2 ISA
- PCI cards mounted on SSI2 PCI
- PCMCIA cards mounted on SSI2 PCMCIA

Step 1 - Powering considerations

There is a +5V power jack on the SSI2 Host CB card which allows using the **pwr-5v** adapter to supply +5V to the SSI2 Host CB card, SSI2 ISA, SSI2 PCI, and SSI2 PCMCIA cards as well.

ARS Technologies offers the pwr-5v to power the SSI2 Host CB. You can learn more about the pwr-5v at:

- External-Power-Supply-5V-pwr5v.html

Step 2 – Mounting

The **pwr-5v** adapter has to be connected to SSI2 Host CB card before mounting it in a Notebook computer.

The SSI2 Host CB card is mounted on a 'Card Bus' slot inside of a Notebook computer. There is no need of additional enclosure.

Step 3 – Connecting

ARS Technologies recommends after first installing the SSI2 Host CB card to check in our Enumerator for the presence of the SSI2 Host CB to make ensure proper mounting.

In addition you can plug and eject the SSI2 Host CB card and check in our Enumerator for these events.

Please check in our Enumerator for connect/disconnect events of the SSI2 ISA, SSI2 PCI and SSI2 PCMCIA cards as well.

4.8 Evolution of SSI2 cards

The ssi2 line have multi-protocol products which works currently through -

- usb , on systems with usb2.0 hosts
- or, with our our ssi2-host-.. cards

We plan

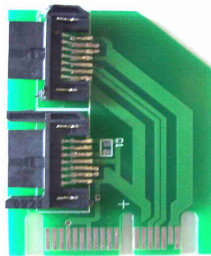
- including additional interfaces
- adding support for devices – iphone/ipad, android ...

5. XPRS Product Line

XPRS line of products allow using of peripheral cards – PCI, ExpressCard, PCI Express, CardBus outside of computer systems – through cable.

This chapter describes the XPRS product line; each individual card; the ways of powering the cards; and how to place the card in an enclosure and connect it to a power source.

5.1 [XPRS-Host-DT card](#)



XPRS-Host-DT product is a kit containing – the card, 2 cables of 0.5m / 1.6” length and a metal bracket.

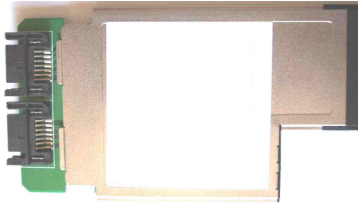
The card is mounted in a computer system (normally a desktop) with PCI Express -x1 connectors.

Optionally XPRS-Host-DT card may be mounted and used in a PCI Express -x16 connectors.

XPRS-Host-DT card connects with all of the XPRS-.. peripheral cards

The web page of the product includes a link showing the way of mounting and use of XPRS-Host-DT in multiple pictures.

5.2 XPRS-Host-EC card



XPRS-Host-EC product is a kit containing – type54 card (as on the picture above), type34 card, and 2 cables of 0.5m / 1.6”.

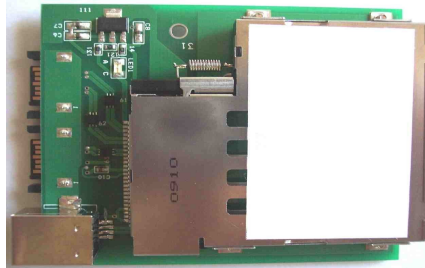
Some computer systems can not take type54 card – please use type 34 card in this case.

The card is mounted in a computer system (normally a notebook) with an ExpressCard slot.

XPRS-Host-EC card connects with all of the XPRS-.. peripheral cards

The web page of the product includes a link showing the way of mounting and use of XPRS-Host-EC in multiple pictures.

5.3 XPRS-EC card



XPRS-EC allows mounting / using of ExpressCard type34 and type54 peripheral cards .

XPRS-EC card connects with all of the XPRS-Host-.. cards

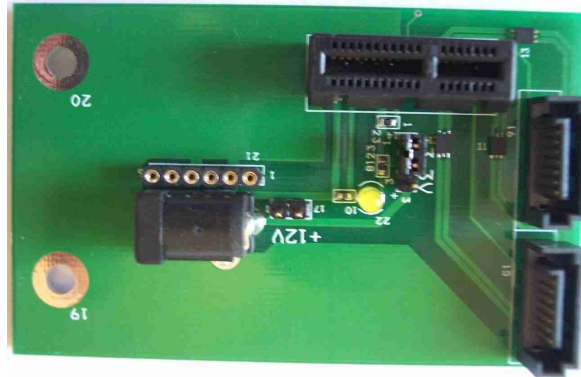
After connecting the cables to already mounted/powered on XPRS-Host-.. card the LED on XPRS-EC has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powered on
- and/or, switch the positions of the cables

The web page of the product includes a link showing the way of mounting and use of XPRS-EC in multiple pictures.

5.4 XPRS-PX-X1 card



XPRS-PX-X1 allows mounting / using of one PCI Express -x1 card.

XPRS- PX-X1 card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS- PX-X1 has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

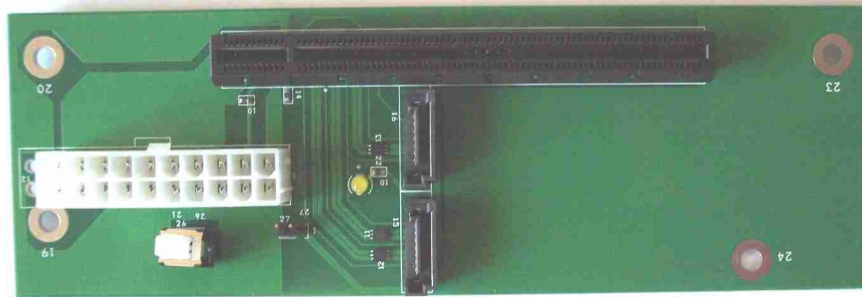
A PCI Express card uses +3.3v and also may require +12v to function.

There are the following ways of powering :

- through the cables - when the PCI Express -x1 card uses/requires only +3.3v, and has current consumption of less than 0.5A; the 3.3v jumpers has to be closed
- through the cables / with 3,3v power module mounted in the 6pin socket - when the PCI Express -x1 card has current consumption of less than 0.5A, and consumes of up to 50mA on +12v; the jumper for +12v has to in closed position; the 3.3v jumpers has to be closed
- through the cables / with 12V external supply connected to the power jack - when the PCI Express -x1 card has current consumption of less than 0.5A, and consumes high current , of up to 5A on +12v

The web page of the product includes a link showing the way of mounting and use of XPRS- PX-X1 in multiple pictures.

5.5 XPRS-PX-X16 card



XPRS-PX-X16 allows mounting / using of one PCI Express -x16 card.

In addition, XPRS-PX-X16 allows mounting / using of one PCI Express -x1 / -x4 / -x8 card, as well.

XPRS- PX-X16 card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS- PX-X16 has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

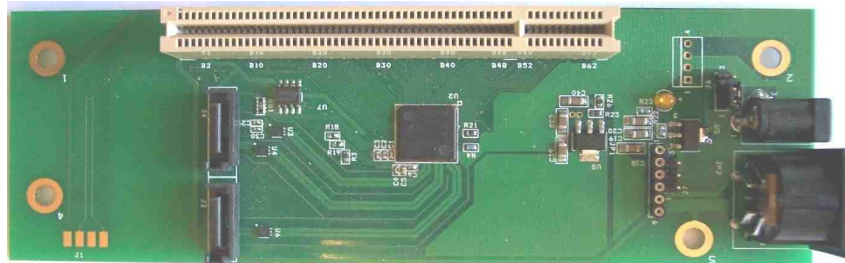
A PCI Express card uses +3.3v and also may require +12v to function.

There are the following ways of powering :

- through the cables - when the PCI Express -x1/4/8/16 card uses/requires only +3.3v, and has current consumption of less than 0.5A; the 3.3v jumpers has to be closed
- through the ATX power supply - when the PCI Express -x1/4/8/16 card has high current consumption on +3,3v and +12v; the 3.3v jumpers has to be open; to turn on the ATX power supply the on-board button has to be pushed

The web page of the product includes a link showing the way of mounting and use of XPRS- PX-X16 in multiple pictures.

5.6 XPRS-PCI-X1 card



XPRS-PCI-X1 allows mounting / using of one PCI card.

XPRS- PCI-X1 card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS- PCI-X1 has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

A PCI card uses normally +3.3v and +5v , and also may require +12v and/or -12v to function.

In the order page for the product , we include the choice to add **pwr-5v** power supply, which connects to power jack.

After mounting the PCI card , we recommend connecting **pwr-5v** power supply, and then connecting cables.

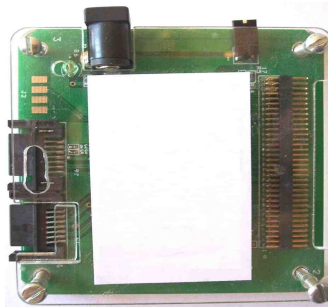
There are the following ways of powering :

- **pwr-5v** power supply and power through the cables - when the PCI card uses/requires only +3.3v and +5v; 3.3v comes through the cables; **pwr-5v** provides +5v; the 3.3v jumper has to be closed
- **pwr-5v** power supply, power through the cables, and **isa-pwr** module - when the PCI card uses/requires +3.3v, +5v, and +12v/-12v; 3.3v comes through the cables; **pwr-5v** provides +5v; **isa-pwr** module provides +12v, -12v; the 3.3v jumper has to be closed
- **isa-pwr-xr** power supply, power through the cables - when the PCI card uses/requires +3.3v, +5v, and +12v/-12v; 3.3v comes through the cables; **isa-pwr-**

xr provides +5v,+12v,-12v; the 3.3v jumper has to be closed

The web page of the product includes a link showing the way of mounting and use of XPRS- PCI-X1 in multiple pictures.

5.7 XPRS-CB card



XPRS-CB allows mounting / using of 32bit PCMCIA card - CardBus type peripheral cards .

XPRS-CB card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS- CB has to be on.

If the LED is not on:

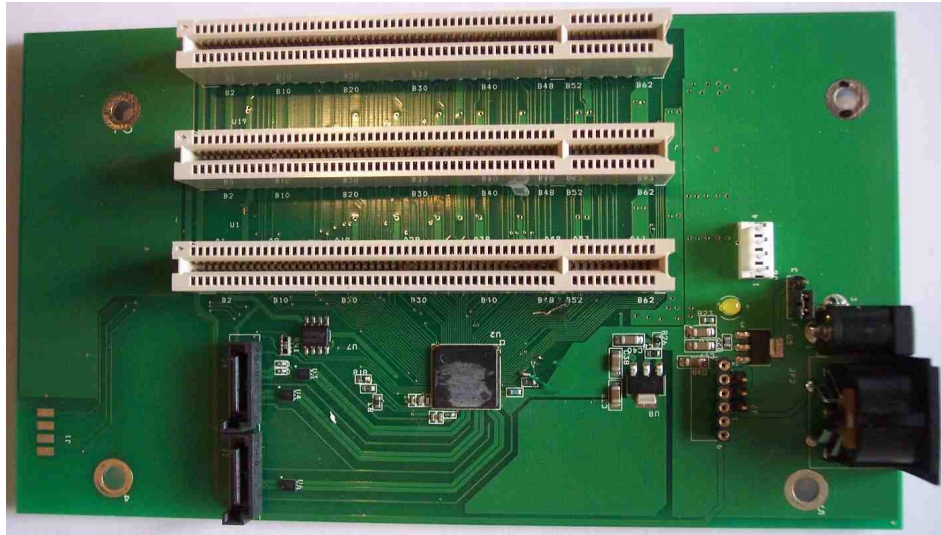
- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

There are the following ways of powering :

- power through the cables - when the +3.3v for the CardBus card comes through the cables; the 3.3v jumper has to be closed
- **pwr-3v** power supply- when the +3.3v for the CardBus card is provided by - **pwr-3v**, which is connected to the power jack; the 3.3v jumper has to be open

The web page of the product includes a link showing the way of mounting and use of XPRS- CB in multiple pictures.

5.8 XPRS-PCI-X3 card



XPRS-PCI-X3 allows mounting / using of up to 3 PCI cards.

XPRS- PCI-X3 card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS- PCI-X3 has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

A PCI card uses normally +3.3v and +5v , and also may require +12v and/or -12v to function.

In the order page for the product , we include the choice to add **pwr-5v** power supply, which connects to power jack.

After mounting the PCI card/s , we recommend connecting **pwr-5v** power supply, and then connecting cables.

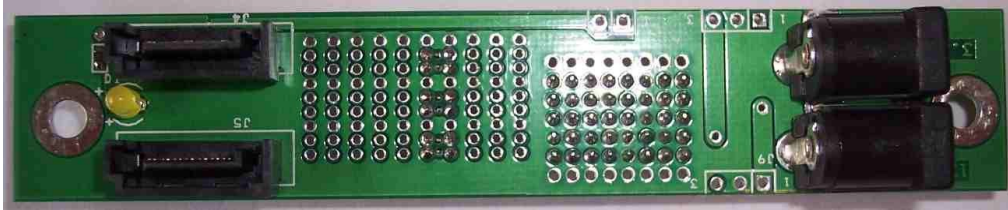
There are the following ways of powering :

- **pwr-5v** power supply and power through the cables - when the PCI card/s uses/requires only +3.3v and +5v; 3.3v comes through the cables; **pwr-5v** provides +5v; the 3.3v jumper has to be closed

- **pwr-5v** power supply, power through the cables, and **isa-pwr** module - when the PCI card/s uses/requires +3.3v, +5v, and +12v/-12v; 3.3v comes through the cables; **pwr-5v** provides +5v; **isa-pwr** module provides +12v, -12v; the 3.3v jumper has to be closed
- **isa-pwr-xr** power supply, power through the cables - when the PCI card/s uses/requires +3.3v, +5v, and +12v/-12v; 3.3v comes through the cables; **isa-pwr-xr** provides +5v,+12v,-12v; the 3.3v jumper has to be closed

The web page of the product includes a link showing the way of mounting and use of XPRS- PCI-X3 in multiple pictures.

5.7 XPRS-cPCIe card



XPRS-cPCIe allows mounting / using of a Compact PCI Express or PXI Express type peripheral cards .

XPRS- cPCIe card connects with all of the XPRS-Host-.. cards

After connecting the cables to already mounted/powerd on XPRS-Host-.. card the LED on XPRS-cPCIe has to be on.

If the LED is not on:

- make sure XPRS-Host-.. card is mounted/powerd on
- and/or, switch the positions of the cables

There are the following ways of powering :

- power through the cables - when the +3.3v for the Compact PCI Express or PXI Express card comes through the cables; the 3.3v jumper has to be closed
- **pwr-3v** power supply - when the +3.3v for the Compact PCI Express or PXI Express card is provided by - **pwr-3v**, which is connected to the power jack; the 3.3v jumper has to be open
- **pwr-3v** + pwr-12v power supplies - when the +3.3v for the Compact PCI Express or PXI Express card is provided by - **pwr-3v**, the +12v for the Compact PCI Express or PXI Express card is provided by - **pwr-12v**, which are connected to the power jacks; the 3.3v jumper has to be open

The web page of the product includes a link showing the way of mounting and use of XPRS- cPCIe in multiple pictures.

6. Installation

6.1 Software Setup

Step 1: Download zip file

The ARS Technologies installation software is packed in a single ZIP file and is available for download at:

www.arstech.com/install2rel.zip

The install file – **install2rel.zip** , after unzipping, has a number of folders, including:

- **\windows** - a folder for the Windows platform; single setup file covers installing for 32bit and 64bit Windows releases
- **\linux** - a folder for the Linux platform; there are 2 separate packages – one for 32bit and for 64bit Linux releases
- **\mac-os-x** - a folder for the Mac OS X platform; single package file covers installing for all Mac OS X releases
- **\4developers** – a folder with information for developers; it includes our simple/basic API set and a sample which covers all operating systems that we support

Step 2: Run the setup file

The Windows platform folder contains a single executable file– **setup-X-Y.exe** , where **-X-Y** represents the current software version, for example **setup-2-130.exe** . Please run this file, and follow the install process.

In the same way Linux and Mac OS X have setup package files - run the particular file, and follow the install process.

Step 3: Run / test / view the installed files

The setup process installs multiple files, however the following are accessible for the user:

- **arsenum** - Enumerator , showing connect/disconnect events and resources
- **arsgui** - utility for manual read/write with peripheral cards
- **users-guide** – this file

6.2 Specifics for Windows platform

Choose the way of starting of the Enumerator – during setup

A message box with a question appears asking:

Run the ARSTech Enumerator

- automatically- at start up
- manually- from the menu

If you choose “Yes”, our Enumerator program **arsenum3** is placed in the -
Start / Programs / StartUp ,
and will be started immediately after boot of the operating system.

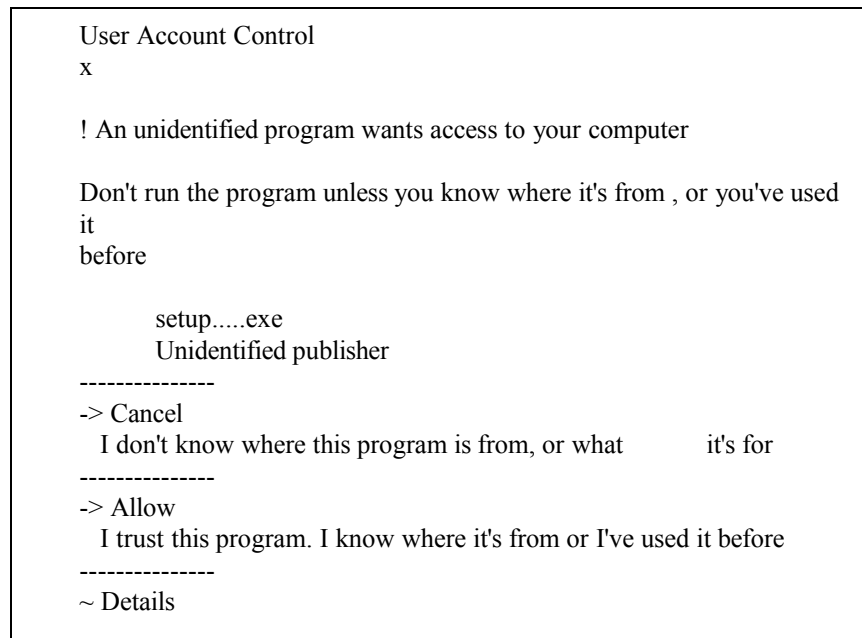
If you choose “No”, our Enumerator program **arsenum3** is placed in the -
Start / Programs / ARSTech ,
and after boot of the operating system have to be started manually.

NOTE!!! It is recommended for first time users to select ‘No’ and start the program manually.

Running programs on Windows Vista , Server 2008 , and Windows 7 operating systems

Modern Windows releases are designed with multiple security layers. When running ARS Technologies programs, or installing our drivers within our installation software, the process goes through multiple dialog boxes, and needs confirmation on every step.

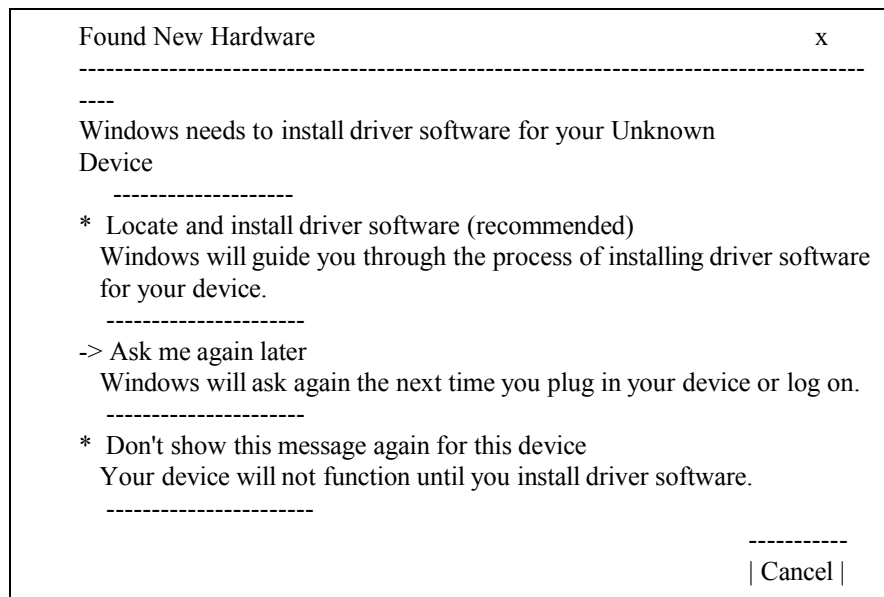
When starting ARS Technologies' **setup.exe**; Enumerator **arsenum3**; or the utilities **arscmd** and **arsgui**, the screen below appears:



Please select and click “***Allow***” to continue and finish the **setup**, run the Enumerator **arsenum3**, or the utilities, **arscmd** or **arsgui**.

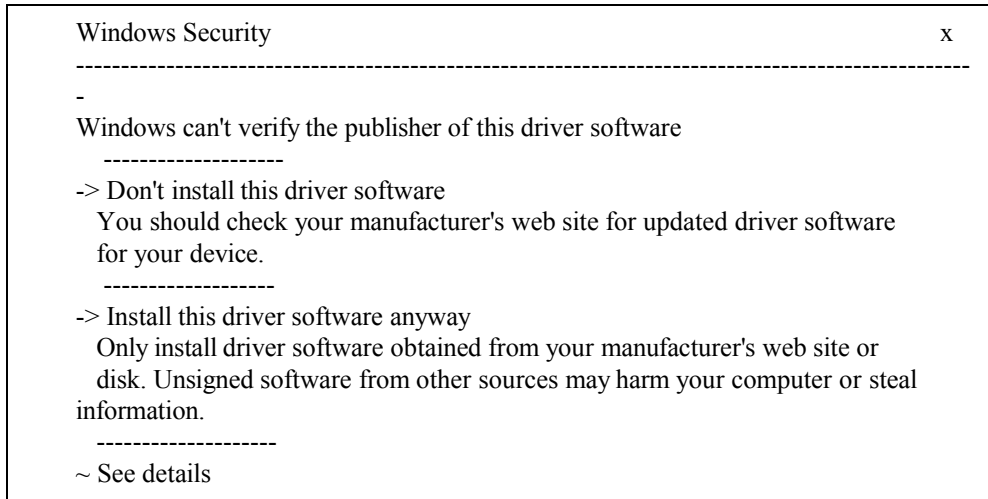
Installing drivers on Windows operating systems

After running the ARS Technologies Enumerator for the first time or, connecting the USB2 / SSI2 / XPRS cards when the Enumerator does not run, the following message box appears:



- Select and click *“Locate and install driver software”*
- There will be a message, *“Windows needs a permission to continue”*
- Click *“Continue”*

A new dialog box appears



ARS Technologies' drivers are not Microsoft certified. However our drivers have been tested in our company and are successfully used by our customers.

Please select and click “*Install this driver software anyway*”.

Next steps

In Chapter 1: *Introduction*, we have mentioned the two groups of customers ARS Technologies serves:

- Developers and/or manufacturers
- End users

For Developers and Manufacturers

After successfully installing the USB2 / SSI2 / XPRS products, the developers and manufacturers can evaluate the work of their ISA, PCI, PCMCIA, PCI Express card using the utility provided in the installation disk, ARSGUI.EXE as described in the next chapters.

The next steps for developers and manufacturers may be to:

- use the basic / simple API set included in the install software to develop peripheral card software
- use the additional commands available in our SDKBUS kit product and convert their software to work on the USB2 products or the SSI2 products; More information is available at: www.arstech.com/SDKBUS.htm

End Users

End users can use the ISA, PCI, or PCMCIA card they have with the original software of the card, using the ARS Technologies Universal Software Layer (USL) feature. More information on the purpose, setting up, and use of the USL is provided in the next chapters.

Upgrading of the software

ARS Technologies offers free upgrades on the installation software for our products. These upgrades are available for download on our web site, packed as a single .zip file at:

www.arstech.com/install2rel.zip

Step 1

The first step in upgrading is to unload the currently running ARS Technologies software. Please bring up the *ARS Technologies Enumerator* **arsenum3** dialog box, and click the 'Unload' button.

Step 2

The next step is to remove the previously installed ARS Technologies software.

After this, please run the **Setup file** and go through the installation process described in the previous chapters. **Please read the important message below:**

Note!!!: Please preserve all older setup-X-Y.exe files, to restore previous software versions, if necessary.

6.3 64bit Windows operating systems

The older Windows operating systems releases are 32bit. However separate 32bit and 64bit versions of - Windows Server 2003, Windows Vista, Windows Server 2008 and Windows 7 are available as well.

Under 64bit releases of Windows Vista, Windows Server 2008 and Windows 7 64bit, normally installing of drivers which are not certified by Microsoft is not allowed. Our software and hardware changes rapidly – it is not practical to re-certify it with Microsoft again and again every time it changes.

The 64bit operating system has to be booted in a special mode, which allows installing of drivers. After power on of the computer, before the operating system starts booting, press **F8** key. This will bring the following screen:

```
Advanced Boot Options
-----
Choose Advanced Options for: Windows setup
(use arrow keys to highlight your choice.)

Safe Mode
Safe Mode with Networking
Safe Mode with command prompt

Enable boot logging
Enable low resolution video (640x480)
Last good configuration (advanced)
Directory service restore mode
Debugging mode
Disable automatic restart on system failure
->Disable driver signature enforcement

Start Windows normally

Description : Allows drivers containing improper signature to be loaded
-----
Enter - choose                      Esc - cancel
```

Select '**Disable driver signature enforcement**' and boot the operating system.

Installing and using our software is done in the same way - as described in the previous chapters.

In order to use our hardware and software under Windows Vista 64bit Windows Server 2008 64bit, and Windows Vista 64bit the operating system must be booted every time in this way.

7. ARSTech Enumerator and ARSGui utility



Location of the utilities – Windows platform

There are 2 utilities installed and available for the end user:

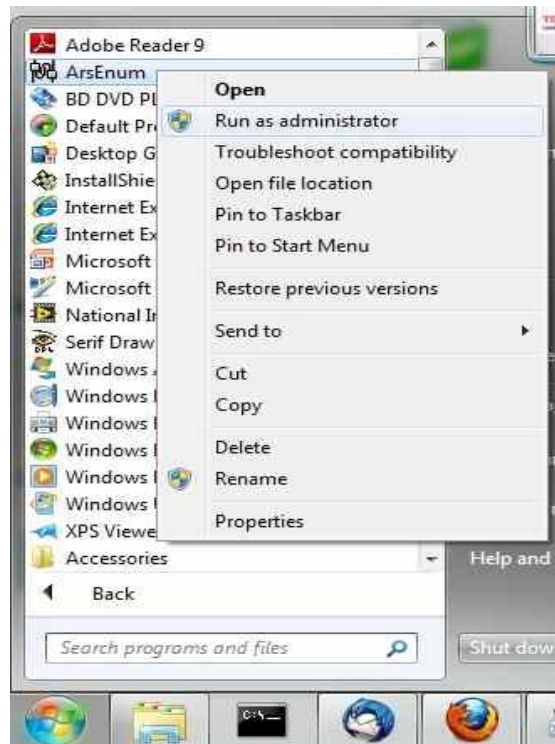
- ArsEnum – enumerator
- ArsGui – read/write test utility

7.1 Starting of ARS Technologies Enumerator

The ARS Technologies Enumerator must run in order to use ISA, PCI, PCMCIA, cards and cards with the USB2 and the SSI2 lines of products.

After setup and installation, the Enumerator program is loaded one of three ways:

- automatically, immediately after the boot of the operating system or
- manually, by clicking on **Start -> Programs -> ARSEnum**
- manually, by clicking **Start -> Programs -> ARSTech -> ARSEnum**

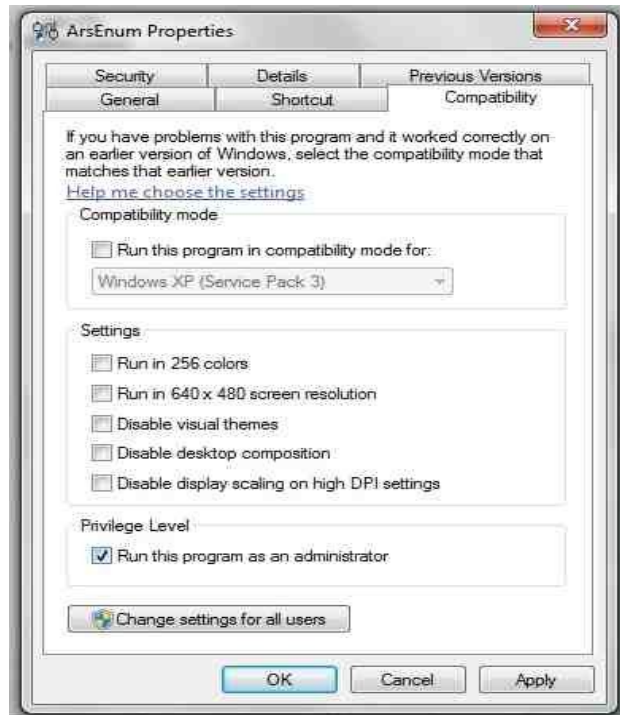


Manually starting the Enumerator in a way of – Run as administrator

Modern operating system releases like Windows Vista, Windows Server 2008 and Windows 7 have strict security requirements in place.

The program have to be started as – Run as administrator .

To adjust the program settings, place mouse cursor over 'ArsEnum' do right mouse click, select 'Properties'.

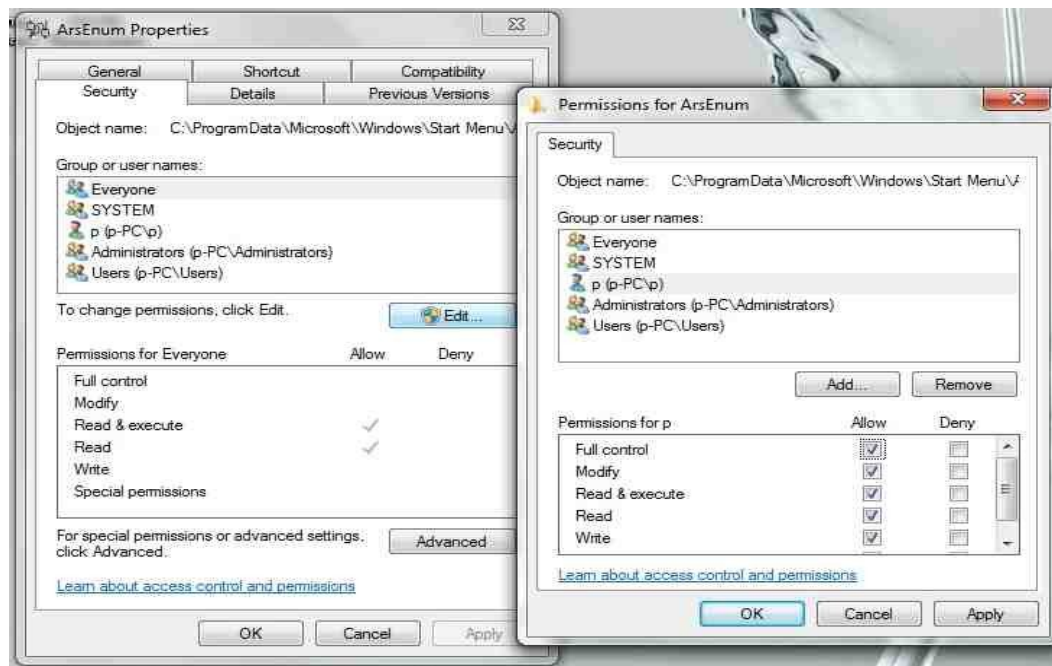


'Run as administrator' may be selected in the 'Properties', as a default way to run 'ArsEnum'.

Under 'Compatibility', check 'Privilege level' to - 'Run as administrator'.

The Enumerator may need to save settings and privileges may need to be adjusted.

Under 'Security', click 'Edit' button. A new screen appears - select 'Everyone', check 'Full Control' -> 'Allow'.

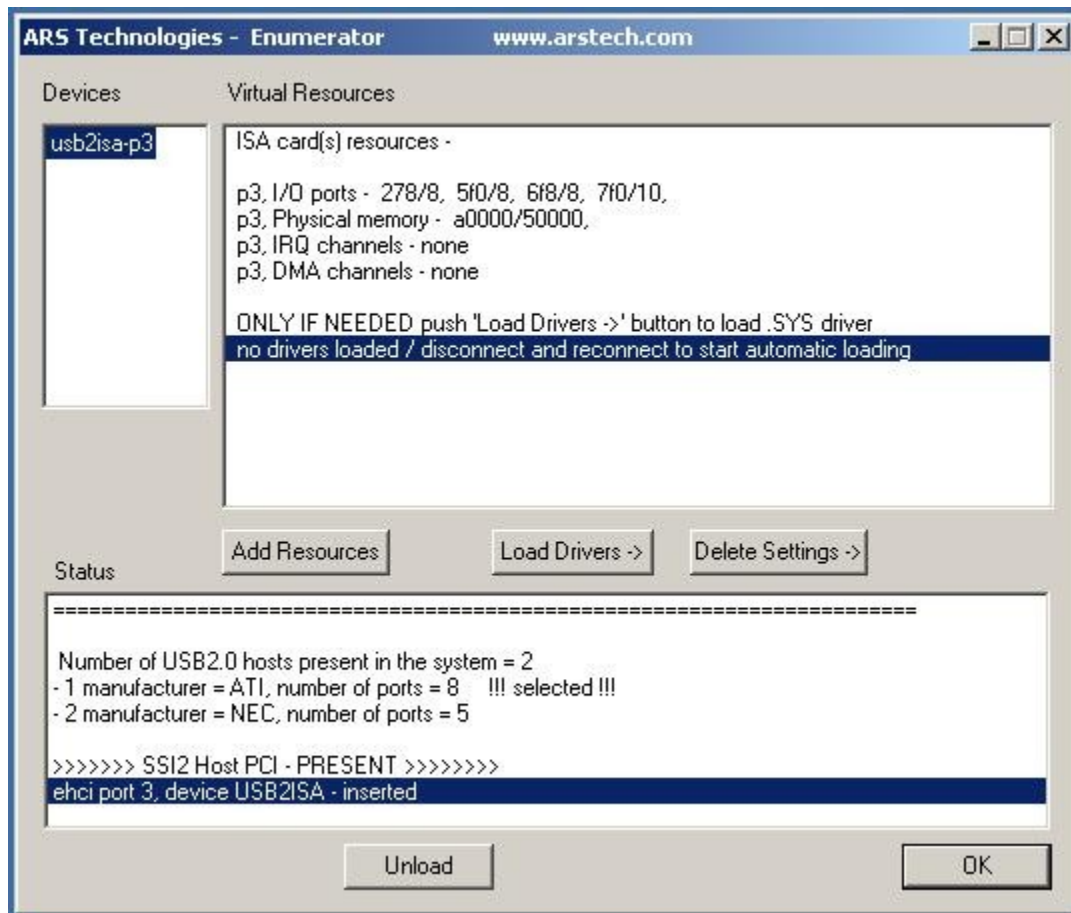


After starting the Enumerator, a screen appears for several seconds and then the Enumerator is minimized. Then the Enumerator appears as an icon in the system tray of the computer, next to the clock, in the down right corner of the computer screen. (See images below.)



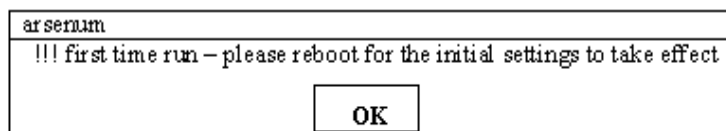
The Enumerator icon may be not visible – click on up arrow 'Show hidden icons' to see the Enumerator icon.

When you double click on the **Enumerator icon**, the main Enumerator windows comes up.



Main window of the Enumerator

When the Enumerator is run for the first time, the message below may appear:



ARSTech Enumerator – first time message

Please follow the instructions and the specifics for the different operating systems presented in previous chapters when the installing and running the Enumerator for the first time.

Our installation software including the Enumerator offers the following features:

- USB 2.0 host controller support and the Universal Software Layer
- SSI2 host / peripheral support
- Automatic detection of the resources of ISA, PCI and PCMCIA cards, and loading drivers if necessary

The following chapters provide detailed information on the each of the above features.



A right mouse click over the icon brings a menu – to minimize/restore/quit .

7.2 Specifics for USB2 products – exclusive mode and host controller support

ARS Technologies USB2 line of products require that at least one USB 2.0 host chip be present on the motherboard.

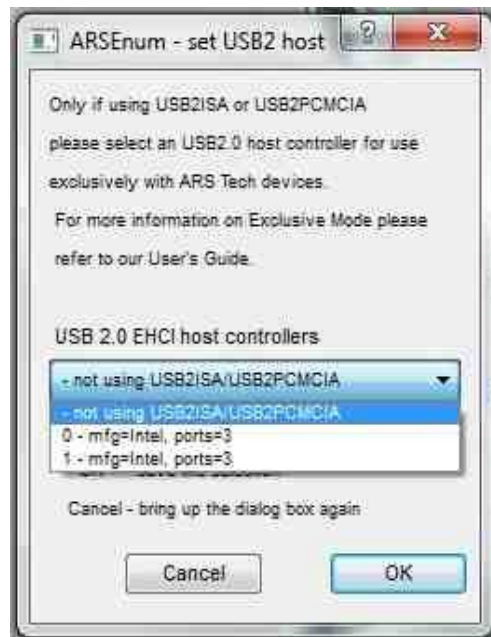
One modern computer system may contain as a minimum one USB 2.0 host chip on the computer motherboard.

Additional USB 2.0 hosts can be added as PCI cards to a desktop computer, or as PCMCIA cards inserted into a notebook computer.

We have designed our own USB 2.0 host controller support, allowing the use of our products under the different operating system releases. Currently our software will work with our products in the same way under all of the Microsoft's operating

systems we support (Windows 98, ME, 2000, XP, Server 2003, Vista, Server 2008 and Windows 7).

When the Enumerator is run for the first time, there is a dialog box for selecting the host controller, as shown in the screen shot below:



ARSTech Enumerator – choosing USB 2.0 host

This handling of USB2 hosts is specific only for our USB2 line of products. Our SSI2 and XPRS lines of products do not need selecting and disabling a USB2 host.

The drop down box lists all of the available USB 2.0 host controllers, for example:

- 0 – mfg=Intel, ports=3
- 1 – mfg=Intel, ports=3

which means that there are total of two USB 2.0 hosts.

The number of ports shows the total physical ports on chip. The actual number of ports going to a USB connector may be lower.

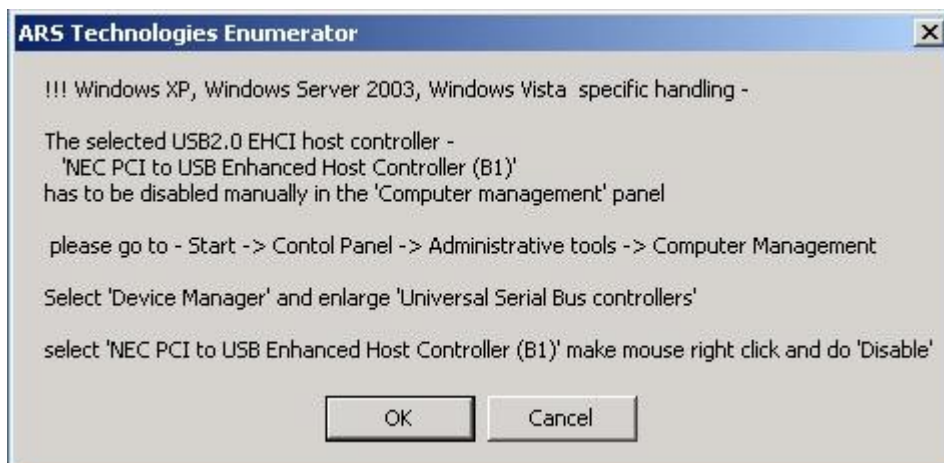
If there is only one choice, it is selected as a default. Please select one of the choices and click OK.

In case there is more than one USB 2.0 host, please use the drop down and select a host.

One USB 2.0 chip- either as part of the chip set on the computer motherboard, or on a PCI peripheral card- consists of one USB 2.0 EHCI controller and several USB 1.1 “companion” UHCI or OHCI controllers.

Though the computer system may have one USB 2.0 chip, and the USB2ISA and USB2PCMCIA devices are serviced by our USB 2.0 host software, other USB devices like a USB keyboard, USB mouse, USB hub, etc. can be serviced by the “companion” USB 1.1 host controllers within the USB 2.0 chip.

Windows XP, Server 2003, Vista, Server 2008 and Windows 7, operating systems need manually disabling of the USB2.0 host driver – if the driver for the particular host is running. There is the following message box coming:

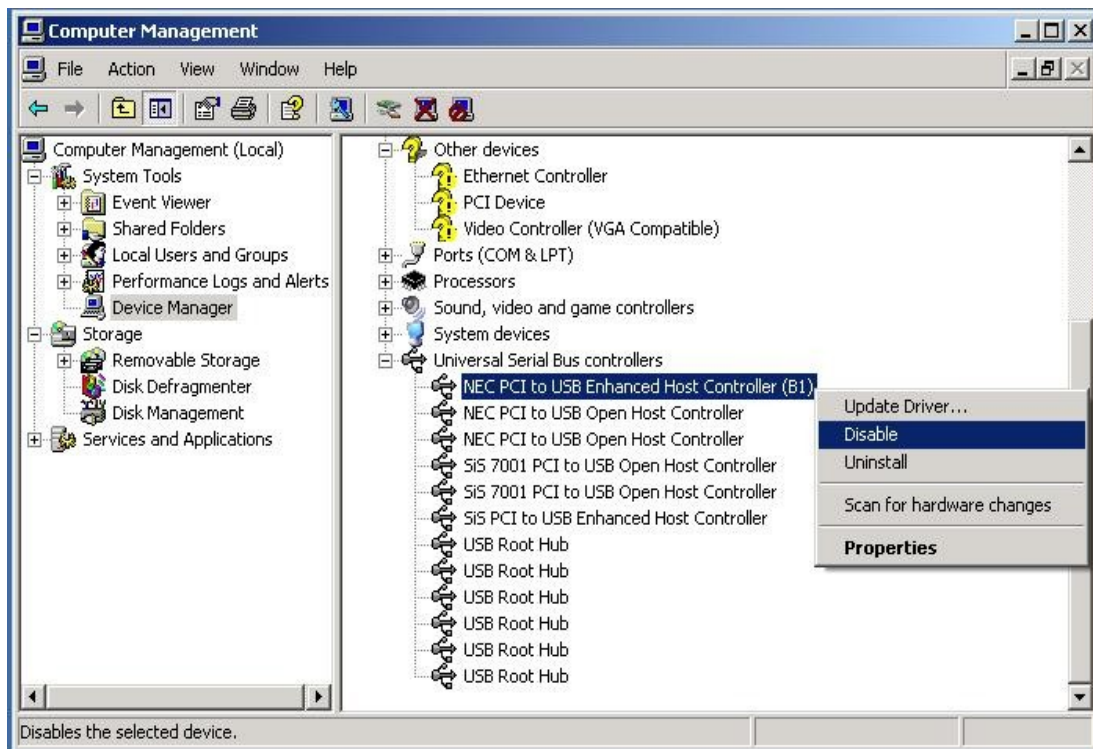


It provides the particular name of the USB2.0 host driver which needs to be disabled.

Open the ‘Device Manager’, select the specified USB2 host driver, and disable it.

If having 2 identical USB2 hosts, as part of the chip set on the motherboard, some of the USB ports located on the computer enclosure are service by one of the USB2 hosts, and some ports by the other.

In this case, when connecting USB2ISA/USB2PCMCIA products, you may need to connect to different ports, in order to find a USB port which belongs to the USB2 host selected and handled by the enumerator.



When disabled, the particular USB2 host driver will be marked as shown -



NOTE 1: ARS Technologies requires having a USB 2.0 host in the system. If the system has only USB 1.1 hosts, please add a USB 2.0 host as a PCI card to a desktop computer or a PCMCIA card to a notebook computer.

NOTE 2: If the system has more than one USB2.0 host, ARS Technologies recommends selecting the last one. Leave the first one, normally belonging to the motherboard, to service other USB devices.

7.3 Specifics for SSI2 products – exclusive mode and host controller support

The SSI2 products connect to and work with standard USB2 host controllers on almost any computer system.

The ssi2-isa/pci/pcmcia product works in a very specific way through usb. We have our own support and the card does not show in the 'device manager' as usb device, however shows in the enumerator.

The enumerator has to have -
'ssi2-host-usb-0'
for ex. listed in the 'status' area.

There is normally only one usb port in the system, which can work with ssi2 cards. The enumerator shows in the 'status' area if the supported usb port is empty or taken. If taken, you can remove usb devices selectively one at a time, and when you find the port you can connect to ssi2-isa/pci/pcmcia .

You need to connect ssi2-isa/pci/pcmcia to all of the different usb ports of the computers you have, and wait 5-30s .
Only one of the usb ports will support ssi2-isa/pci/pcmcia and will show up in the enumerator.

Another way to find the specific supported usb port is to plug a standard usb device to all available usb ports and check for a message in the enumerator -
'usb port not available/taken'.
Then you can plug the ssi2-isa/pci/pcmcia only to this port.

If disabled, the usb2 host driver can be re-enabled. Disabled driver is needed only for our older usb2isa/pcmcia .

If you have 2 usb2 hosts listed, you can have also 2 supported ports to connect ssi2-isa/pci/pcmcia .

In summary -

step1 - the enumerator has to have 'ssi2-host-usb' listed in the 'status' area.

step2 - finding the supported usb port, plug/use ssi2-isa/pci/pcmcia on this port

7.4 Universal Software Layer

The Universal Software Layer (USL) is part of the installation software for ARS Technologies products that allow redirection of resources through USB – for our 'USB2' products and for our 'SSI2' products.

This redirection allows the use of an ISA, PCI, and PCMCIA card through USB with the original software of the particular card.

Every ISA, PCI and PCMCIA cards has associated resources for itself, which may be a combination of :

- I/O ports
- Physical memory area
- IRQ channels
- DMA channels (ISA only)

Resources

For **example, a multifunction ISA card** with one disk controller, one floppy controller, one parallel port and two serial ports has:

- disk - 10 I/O ports - base port 1f0 or 170 , 8 ports + 3f6,7 or 376,7 , 2 ports , and 1 IRQ channel - IRQ14 or 15
- serial ports - base port 3f8 or 3e8 or 2f8 or 2e8 , 8 ports , and IRQ channels - IRQ3 or 4
- parallel port - ...
- floppy - ...

An example of a PCMCIA card is a PCMCIA modem having:

- 8 I/O ports , located anywhere in the I/O space without conflicts , and 1 IRQ channel

An example of a PCI card is a PCI network card having:

- 4096 bytes of physical memory, located anywhere in the memory space without conflicts , and 1 IRQ channel

After connecting an ISA, PCI , or a PCMCIA card to our 'USB2' or SSI2' products, the Enumerator automatically checks for the resources on the ISA, PCI card(s) or the PCMCIA card, and automatically redirects these resources through USB.

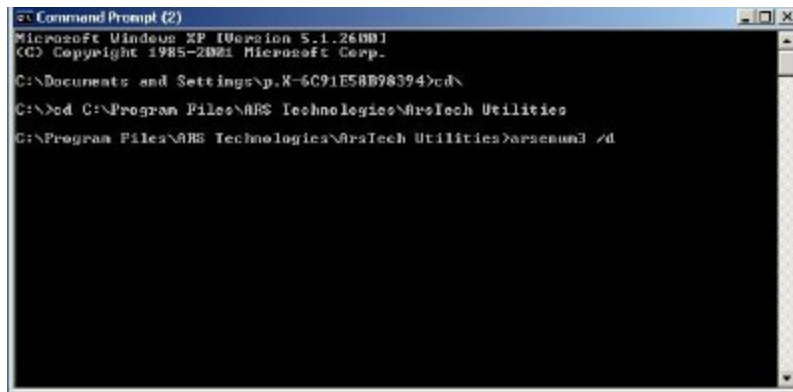
NOTE 1: All of the device handled by the Universal Software Layer share the same I/O space, Memory area, and IRQ channels with all the other devices on the computer system. **When there are hardware conflicts it maybe necessary to manually change and adjust the resources settings.**

NOTE 2: ARS Technologies cannot guarantee that the software for an ISA, PCI , or PCMCIA card under the USL will work with all combinations of computer hardware, operating systems, and ISA, PCI or PCMCIA card software.

7.5 Diagnostics mode of the ARS Technologies Enumerator

The Enumerator has to run on a wide variety of computer systems. If problems are encountered – 'freezing', 'blue screen', 'crashing', there is a special *diagnostics mode* which allow execution step by step, and pinpointing the issue.

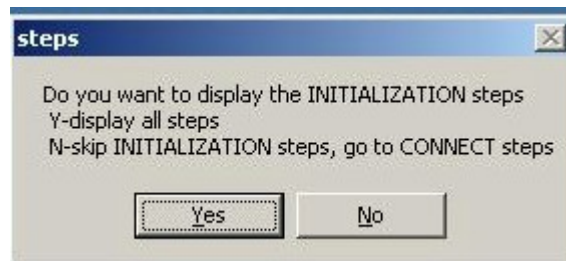
The *diagnostics mode* is entered from command line -



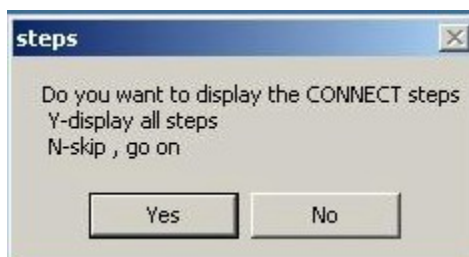
The default installation folder is - C:\Program Files\ARS Technologies\ArsTech Utilities .
Change the folder to the current / default folder and run → **arsenum3 /d**

You as a user may need to enter this mode only for diagnostics purposes – normally this mode is not entered or used.

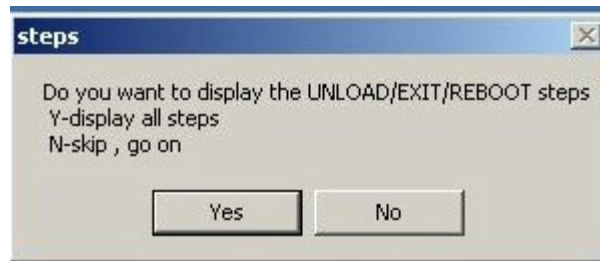
There will be 3 separate message boxes with Yes/No buttons for – *initialization*, *connect*, *exit* phases of the work of the Enumerator:



then,



then,



Depending on the Yes/No selection all of some of the steps will be displayed in a way as -



Push 'OK' and remember the last successfully completed step before - 'freezing', 'blue screen', 'crashing'.

You can contact us with the following details :

- last successfully completed step
- computer system model/type - desktop/notebook
- processor maker, clock – Intel/AMD..., single/multi core...

7.6 Main Enumerator window

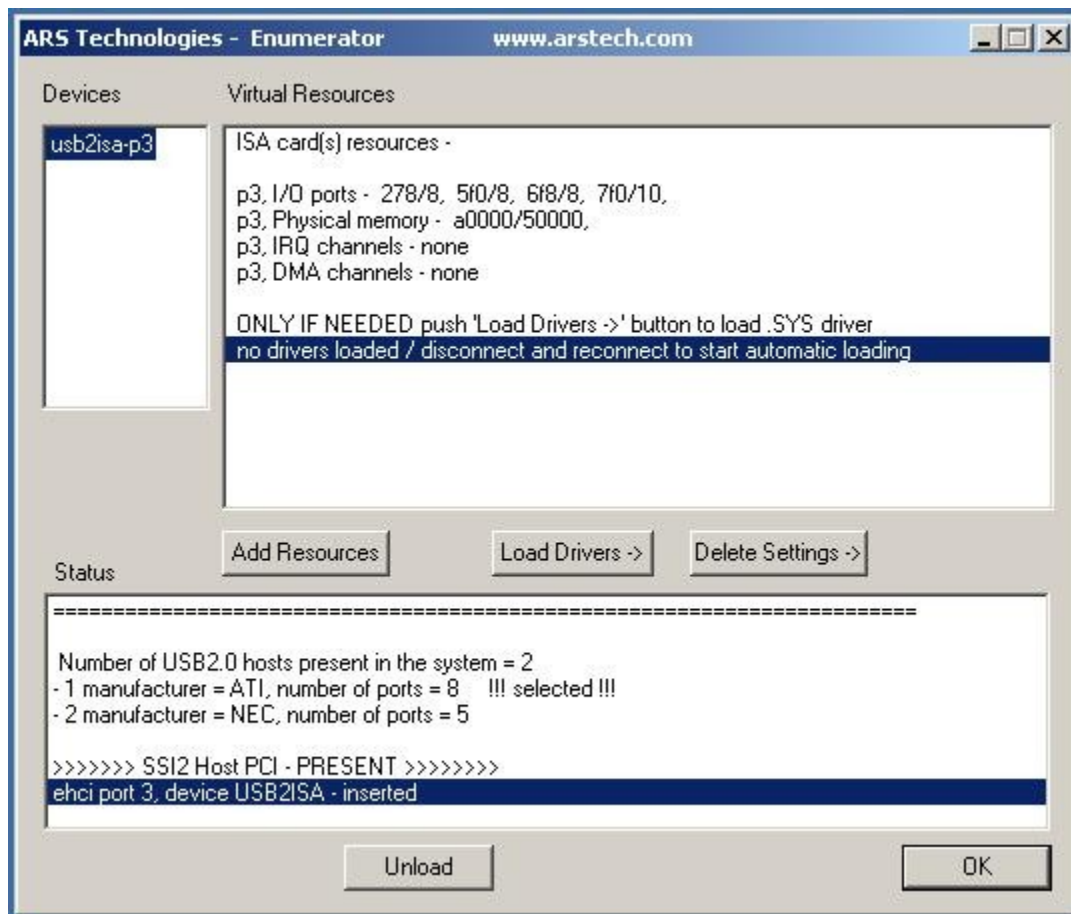
The main ARS Technologies Enumerator window is brought up by double clicking on the Enumerator icon in the system tray.

Clicking the “**OK**” button will close the window, however *the Enumerator still runs*. Clicking the “**Unload**” button will remove the Enumerator application and the Enumerator icon from the system tray.

There are three areas in the Enumerator window:

- **Devices** area – shows currently connected devices
The groups currently available:
 - USB2 line of devices, showing as for example USB2ISA-p1 , USB2PCMCIA-p4
 - SSI2 line of devices, showing as for example SSI2-ISA-0 , SSI2-PCMCIA-0 , SSI2-PCI-0
- **Virtual Resources** area – shows information about the card and resources
- **Status** area – shows available hosts, the short status messages, for example insertion / removal, error messages

A screen shot of the ARSTech Enumerator –main Enumerator window is on the next page.



Examples

When a USB2ISA card is connected, the *Devices* area shows “usb2isa-p1”, and the *Status* shows “ehci port 1, device USB2ISA - inserted”.

The *Status* area provides information on the number of present USB2.0 host(s), the manufacturer’s name, number of USB ports and the selected USB2.0 host for use by the ARSTech Enumerator.

Selecting the “usb2isa-p1” in the *Devices* area, for example creates the following text in the *Virtual Resources* area:

```
ISA card(s) resources
p5, Detected I/O ports - 278/8, 6f8/8, 7f0/8
p5, Detected memory – none
```

There are three buttons in the middle of the Enumerator window:

- **Add Resources** - clicking it will bring a dialog box for manually adding resources which have not been detected.
- **Load Drivers** - applies only to an ISA device, with a driver which needs loading; clicking it will bring load driver dialog box.
- **Delete Settings** - clicking this button will remove previously entered settings.

7.7 Adding resources

The Enumerator auto-detects resources, however the auto-detect process is not perfect. Some peripheral cards hide their resources and need a sequence of commands to enable these resources.

When not detected, resources can be added manually for an ISA , PCMCIA , PCI , PCI Express card by clicking the **Add Resources** button.

A dialog box comes up, where the status area contains:

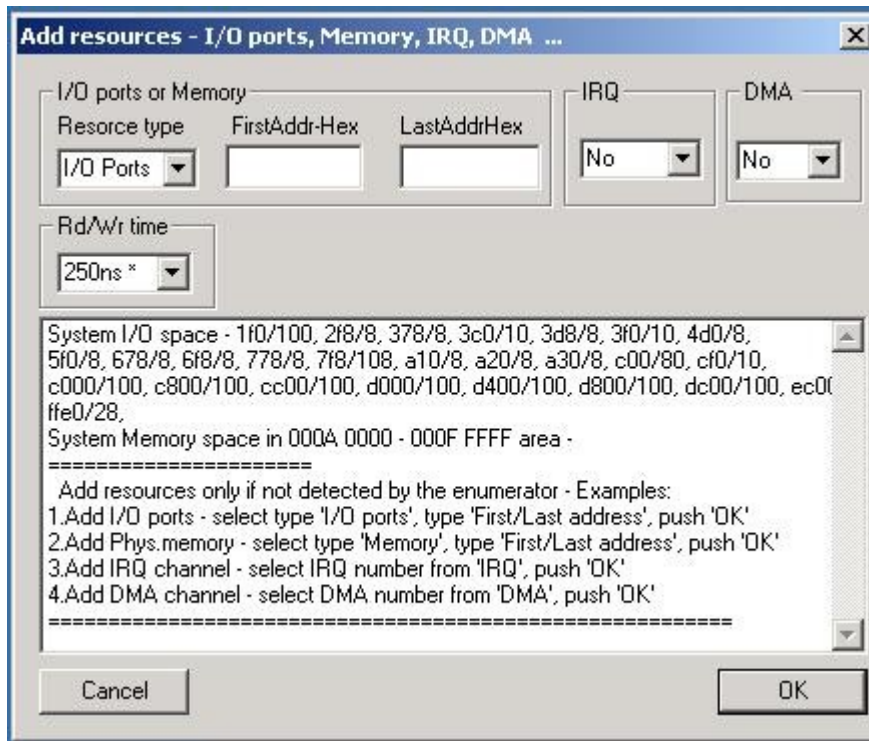
- the system I/O ports used
- the system physical memory

In addition, there are instructions on way of adding resources.

The dialog box allows adding:

- I/O ports
- Physical memory
- IRQ channels
- DMA channels (ISA card only)
- Extend/shorten the read/write timing

The Enumerator allows setting the read/write cycle time of the ISA or 16bit PCMCIA bus. By standard, the time is 250ns and it may be extended to 2.3µs.

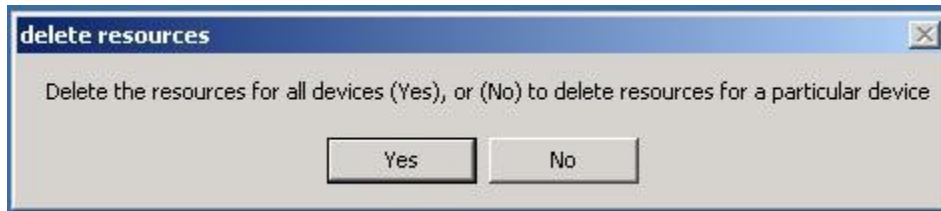


Add Resources dialog box

Resources need to be added one at a time. In order to add another resource, please click the **Add Resources** button again.

7.6 Delete Settings, choosing another host

Clicking the “*Delete Settings*” button will bring the following message box –



ARSTech Enumerator –delete settings message box

Selecting *Yes* will delete:

- the settings for all of the previously loaded devices
- the USB2 host settings
- the current manually added resources

Running the Enumerator again will bring a dialog box to select the USB 2.0 host.

Selecting *No* will delete settings for the currently selected device.

If a device is still connected, the message box below appears:



The connected device has to be disconnected before completing “*Delete Settings*”.

7.7 Loading drivers

Some peripherals like PCMCIA cards and Plug and Play (PNP) ISA cards allow for obtaining information about the card, and loading one or more drivers for the card. The appropriate drivers are loaded automatically by the ARS Technologies Enumerator. There is no need of manual loading.

Other peripheral cards have drivers which do not need loading or do not use a driver. In such cases, there is no need of driver loading as well.

Some peripherals like standard (non Plug and Play) ISA cards are serviced by drivers, and these drivers need to be loaded.

One ISA card may contain several devices, and each of these devices may or may not need loading of a driver.

Every ISA card has a certain range of the of some, or all of the resources listed below:

- I/O port addresses
- Memory area addresses
- IRQ channels
- DMA channels

Examples of resources

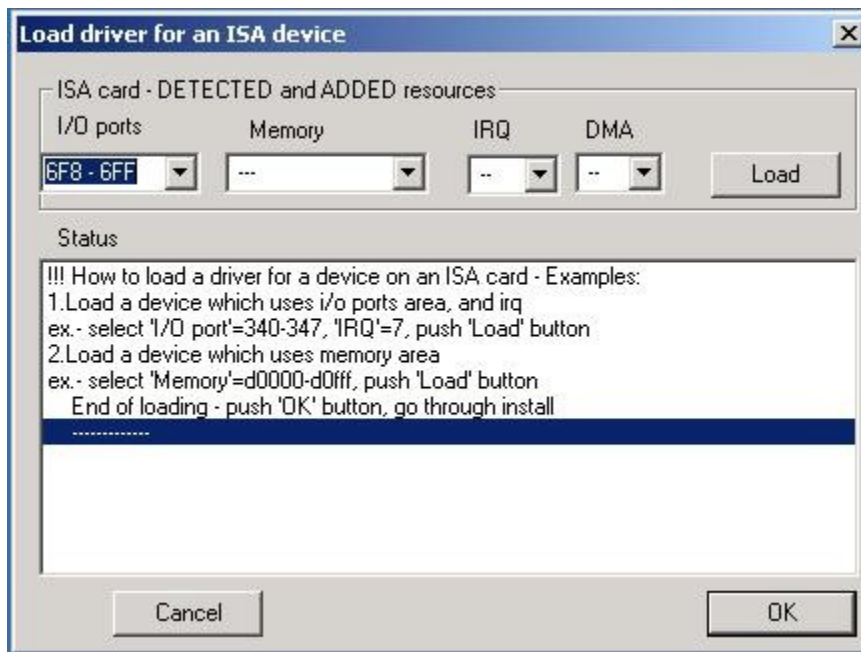
One device is defined as a combination of one or more of the above resource types. For example, a **serial port** is a combination of 8 I/O ports and 1 IRQ channel.

A **floppy disk controller** is a combination of 6 I/O ports, 1 IRQ channel and 1 DMA channel.

Loading one or more drivers

In the case there is need to loading of one or more drivers for the devices on the ISA card, you will need to bring up the main Enumerator window by double clicking on the Enumerator icon and click “***Load Drivers***”.

This will bring the following dialog box shown on the next page:



Load driver dialog box

The dialog box has resources sections and a status area:

- *I/O, Memory, IRQ, DMA* - section , in the top part of the dialog box
- *Status* – an area on the lower part of the dialog box

The process of selecting goes as follows:

1. Select one of the I/O ports / Memory ranges listed in the drop down boxes
2. If necessary, select one of the IRQ / DMA channels listed in the drop down boxes
3. Click the “**Load**” button; the status provides a feedback on the selection

Repeat the above steps for different I/O ports / Memory + IRQ / DMA ranges, if needed. When finished adding, please go to the next section .

The selections provided for I/O port and Memory ranges are found automatically after scanning, or added manually, and depend on the ISA/PCMCIA card mounted. Each is responding to different addresses.

When finished adding:

Click the “OK” button

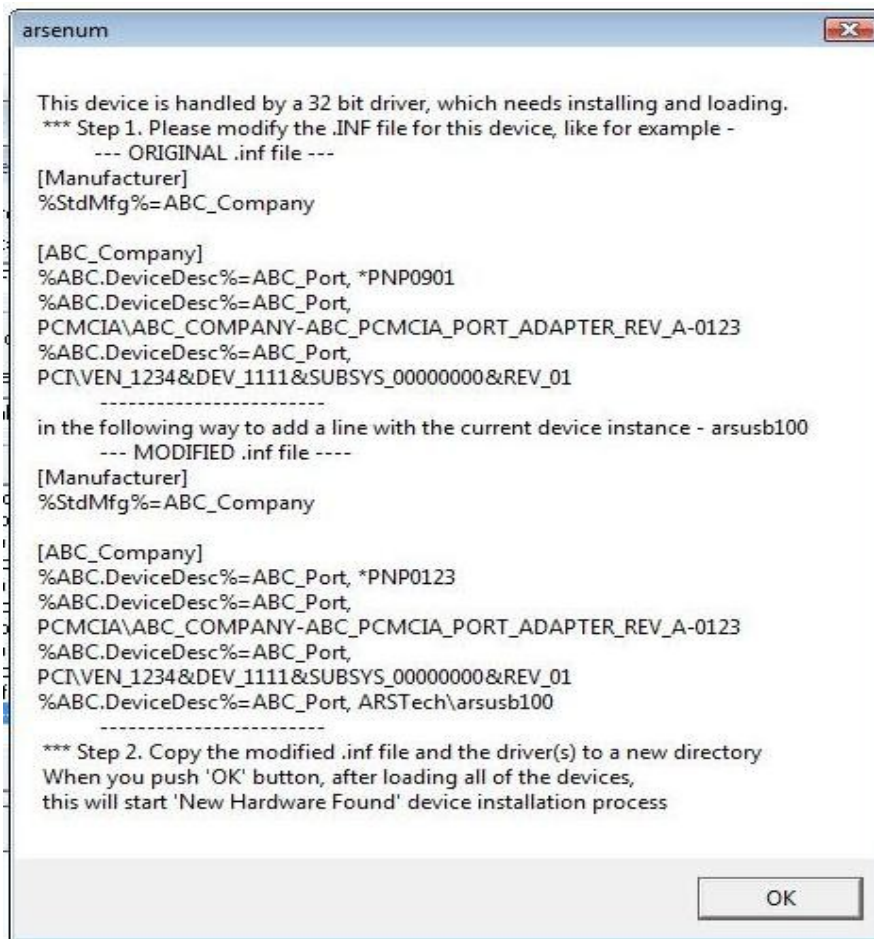
A message box appears with the current device instance.

The original installation software disk for an ISA card (on a floppy or a CD) contains the .inf installation files and hold the drivers for the devices on a particular ISA card.

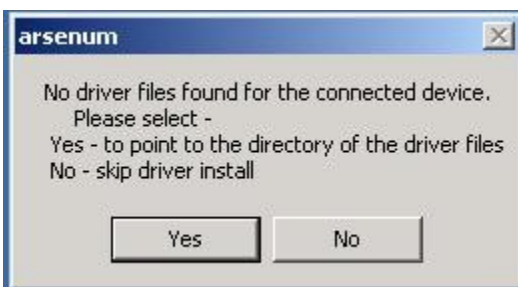
Modifying .inf files

The .inf installation files for the different devices need to be modified manually in order to install and load drivers for a device on an ISA card mounted to a USB2ISA and SSI2-ISA.

To modify the .inf file, please pay careful attention to the message box which will give you the current device instance- for example, **arsusb100** , **arsusb101**, ... or **PCIIVEN_0010&DEV_0064**, **PCIIVEN_0010&DEV_0065** ... etc, and the location where the modification is made. Please refer to next chapters for examples of modified .inf files.



The Enumerator will bring next a message box as shown below:



ARSTech Enumerator –no driver files found message

Clicking the “Yes” button will bring a file open dialog box for finding and opening the .inf file for the PCMCIA card.

In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the “***Found New Hardware***” installation process of the operating system and load the driver for the card.

7.8 Example of a modified .INF file for installing

An example of a modified .inf file for Windows 2000, XP, Server 2003, Vista ,Server 2008 and 7 operating systems is shown bellow.

The example provided is for reference purposes only. You will need to:

1. Identify the [Manufacturer] section,
2. Add a line with the particular device instance
3. Save the file – preferably under a new name
4. Point to this file – when needed

The example below adds a line with the device instance - **PCI\VEN_0010&DEV_0064** .

```
-----
-
;
;Copyright (c) ARS Technologies - All rights Reserved
;
;Module Name:
;
;    arswdm2kxp.INF
;
;Abstract:
;    INF file for installing of a sample wdm driver :
;
;    operating systems - Windows 2000, XP, Server 2003, Vista, Server 2008, 7
;

[Version]
Signature="$WINDOWS NT$"
Class=Sample
ClassGuid={78A1C341-4539-11d3-B88D-00C04FAD5171}
Provider=%ARS%

[DestinationDirs]
DefaultDestDir = 12

; ===== Class section =====
[ClassInstall32]
Addreg=SampleClassReg

[SampleClassReg]
HKR,,0,%ClassName%
HKR,,Icon,-5

; ===== Device Install section =====
[Manufacturer]
%ARS%=ARS

[SourceDisksFiles]
arswdm1.sys=1

[SourceDisksNames]
1=%DISK_NAME%,

[ARS]
; DisplayName          Section          DeviceId
; -----
%ARSwdm1.DRVDESC%=ARSwdm1_Inst,root\ARSwdm1
; !!! modified here !!!
%ARSwdm1.DRVDESC%=ARSwdm1_Inst,PCI\VEN_0010&DEV_0064
```

```
[ARSwdm1_Inst.NT]
CopyFiles=ARSwdm1.CopyFiles

[ARSwdm1.CopyFiles]
arswdm1.sys

[ARSwdm1_Inst.NT.Services]
AddService=ARSwdm1,0x00000002,ARSwdm1_Service

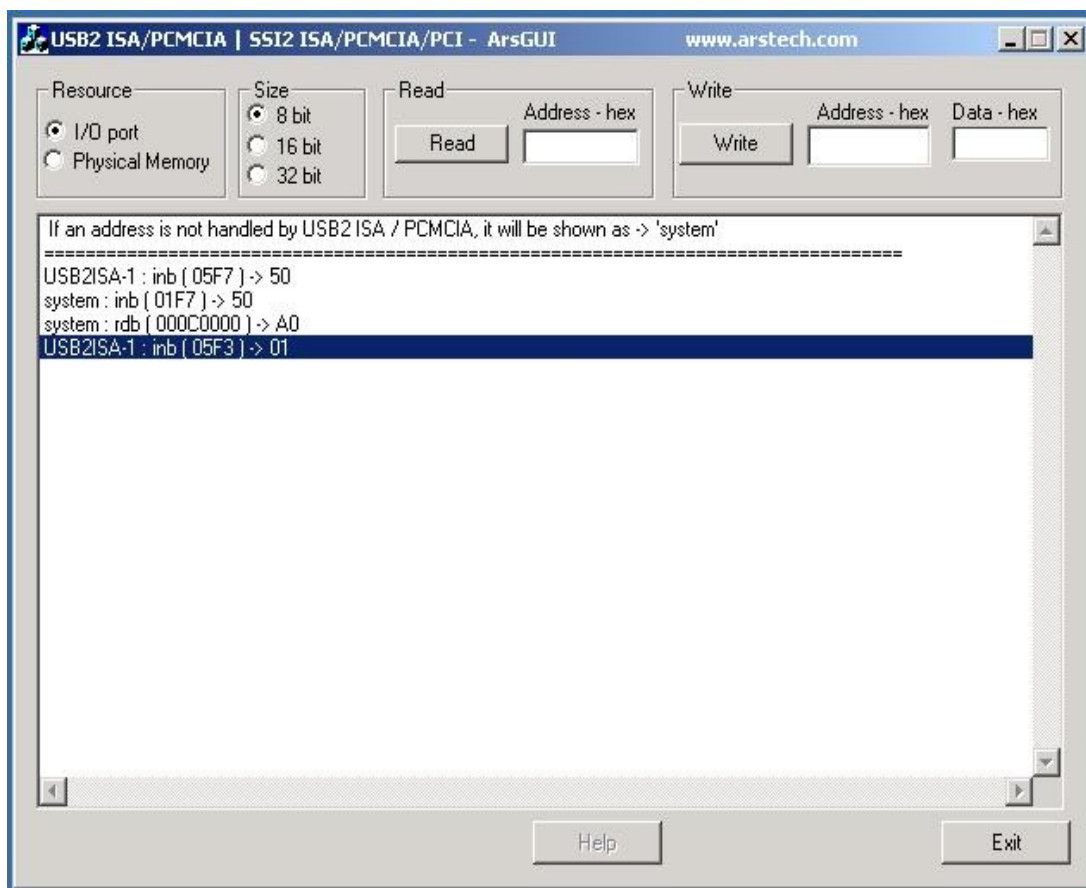
[ARSwdm1_Service]
DisplayName       = %ARSwdm1.SVCDESC%
ServiceType       = 1                ; SERVICE_KERNEL_DRIVER
StartType         = 3                ; SERVICE_DEMAND_START
ErrorControl       = 1                ; SERVICE_ERROR_NORMAL
ServiceBinary      = %12%\arswdm1.sys

[Strings]
ARS = "ARS Technologies"
ClassName = "ARS Technologies Sample Drivers"
ARSwdm1.SVCDESC = "ARS Technologies Sample wdm Service"
ARSwdm1.DRVDESC = "ARS Technologies Sample wdm Driver"
DISK_NAME = "ARS Technologies Sample Install Disk"
-----
-
```

7.9 ArsGUI

The ArsGUI is a graphical user interface program that allows manual read/write functions of I/O ports and Physical memory.

The ArsGUI utility allows access to resources on ISA and PCMCIA cards mounted on our USB2.0 line of products, and access to resources on ISA, PCI and PCMCIA cards mounted on our SSI2 line of products.



ArsGUI – main screen

Step 1:

When using the application, the first thing to select is the **Resource** type. Decide if it will be I/O port or Physical Memory.

Step 2:

Select a **Size** - 8bit, 16bit or 32bit.

Step 3: Read or Write

- **To do a read**, type the hexadecimal address in the edit box, and push the **Read** button.
- **To do a write**, type the hexadecimal address and the hexadecimal data in the two edit boxes. Then push the **Write** button.

The results are displayed in the main status area.

With cards mounted to a USB2ISA/USB2PCMCIA type card

When reading or writing resources on ISA/PCMCIA cards mounted on connected USB2ISA or USB2PCMCIA cards, the status shows the device as connected. For example, “USB2ISA-1” and the results from the operation.

With cards mounted to an SSI2 ISA, SSI2 PCI or SSI2 PCMCIA type card

When reading or writing resources on ISA/PCI/PCMCIA cards mounted on connected SSI2 ISA, SSI2 PCI or SSI2 PCMCIA cards, the resources are part of the computer system's resources. The status shows “System” and the results from the operation.

The ArsGui utility is a powerful utility and extreme care must be taken when deciding what resources are accessed. Be careful when writing to memory or i/o areas of the system.

Exiting

To exit the application, click the **Exit** button.

7.10 Developers' support – basic/simple API set for access of ISA / PCI / PCMCIA hardware

Introduction

This chapter will help a developer of hardware and software to bring up the hardware, and develop / build / debug / test the software to working condition.

We offer a subset of our API set from our commercial product - SDKBUS, to ISA / PCI / PCMCIA software developers.

The current version is based specifically on our USB2 line of products - USB2ISA family products and USB2PCMCIA, and the SSI2 line of products - SSI2 ISA, SSI2 PCI, SSI2 PCMCIA .

We are establishing a standard , in dealing with peripherals , for all of the operating systems , programming levels , and programming languages we support .

The general API set is available on user / application level, for the following languages:

- c/c++ - Windows, Linux, Mac OS X platforms
- Visual Basic - Windows platform

The API set is available through a static library / archive. Use of the API set is demonstrated in the 'isarw' sample.

Hardware not working yet

We offer a test utility - ArsGui which can generate access commands to read/write to i/o ports, and physical memory to a peripheral connected on our USB2 and SSI2 products.

A developer of the hardware can analyze how is the generated access handled by the peripheral card hardware - modify it, and bring it to working condition.

Connecting existing and new peripheral card hardware

One hardware peripheral device is a collection of one or more of the following resources:

- physical memory registers
- i/o ports registers
- IRQ channels
- DMA channels (ISA bus only)

A developer has to know the exact resources by the peripheral card.

When the peripheral card is mounted on one of our products, the ARSTech Enumerator auto-detects resources.

The developer has to compare the detected resources with what the peripheral card actually has.

The card may contain hidden resources, made available after software initialization. If needed, the developer may add manually resources in the enumerator for the particular peripheral card.

Developing software for a new peripheral card

Our API set, as described in the 'ars-api.txt', is available as part of our installation software.

A developer may build a variety of applications including - stand alone / command line, or graphical GUI/X application.

An additional API set and samples are available in our SDKBUS product.

Working sample of use

Pre-requisites

To illustrate the use of the API set we offer one sample which can be built and used in real world conditions.

The sample uses one of our USB2ISA family cards - you will need to order one, download the installation software, setup the software, and get familiar with our user's guide.

Different environments may have some specific requirements for installing and setup.

In addition, the sample uses 2 ISA cards :

- standard ISA i/o card which includes - 1 floppy and 1 ide controllers, 1 parallel, 2 serial ports; this type of card was popular in the past - with dozens of different manufacturers, and millions of cards produced;
- standard ISA VGA card; popular in the past as well - with lots of different manufacturers and cards produced;

You can mount USB2ISA + ISA cards, and connect/disconnect to USB. The ARSTech Enumerator will show auto detected resources for the connected ISA card - i/o ports, memory area, IRQ channels.

If some resources are not detected, they can be added manually in the Enumerator.

The resources of the particular used ISA cards may appear as :

- ISA i/o card - i/o ports: 278/8, 5f0/8, 7f0/10 | irq: 4,7,14

device interpretation:

~ i/o port x278/8 + irq 7 are the resources for LPT2, as selected by the jumpers on the particular isa card;

~ i/o port x5f0/8 + irq 14 are the resources for the IDE controller; initially located at i/o address x1f0; the enumerator 're-located' it with x400 to avoid a collision with the controller on the motherboard of the system;

~ i/o port x7f0/10 + irq 4 are several devices; the address is i/o x3f0 're-located' with x400 to avoid a collision; x7f0-7f3 are floppy controller ports, the irq6 is not connected by jumpers; i/o x7f6-7f7 are IDE ports; i/o x7f8-7ff + irq 4 are the COM1 ports; COM2 ports and irq are not connected / enabled by jumpers;

- ISA VGA card - i/o ports: i/o ports x3c0/10 | irq 9 | physical memory xc0000/8000

device interpretation:

the card has a video BIOS area - x0c0000/8000, which has to be executed in order to initialize and 'see' the video ram area - x0a0000+ ; the video card is controlled through the i/o ports and irq channel;

Building of the 'isarw' sample

Almost identical 'C/Cpp' source code is placed in a number of folders for the different environments - Windows, Linux, Mac OS X.

The source code of the sample includes switches for defining of the environment :

```
.....  
#define    WINDOWS  
//#define  LINUX  
//#define  MACOSX  
.....
```

In this way identical source code can be used for cross platform development.

Windows folder includes 2 samples built with - Visual C++ 6.0 and Visual Basic 6.0.

Linux, and Mac OS X come with the GCC compiler environment - already pre-installed.

To build, go to the particular folder and run from terminal/command line -
./mk.bat

Under 64bit Windows environment the sample built as 32bit application can still execute and work .

We provide a number of Linux shared libraries containing our API set - built on different kernels, including 2.6.11/2.6.18/2.6.23 32bit, and 2.6.23 64bit .

Under 64bit Linux environments the application has to be built as 64bit app, and needs to use the 64bit shared library.

Running of the 'isarw' sample

The 'isarw' sample contains 3 sub-tests :

a) i/o read/write test

- uses USB2ISA with an ISA i/o card - uses the parallel port portion of the card
- does write to the par.port - digital outputs, which may be observed with a voltmeter on the 25pin connector
- exercises in8(),out8() - single 8bit i/o port read/write commands of the API set

b) irq test

- uses USB2ISA with an ISA i/o card - uses the parallel port portion of the card;

requires an additional wire connecting 2 pins on the 25 pin con.

- exercises GetIrqDmaSts(), in8(),out8() - checking irq and dma status, and single 8bit i/o port read/write commands of the API set

c) physical memory buffer read test

- uses USB2ISA with an ISA VGA card - uses the VGA BIOS on the card
- does a single read of a portion of the VGA BIOS
- exercises rd16() - 16bit phys.mem. read commands of the API set

8. ISA cards - use

This chapter describes the way of use of ISA cards on our 'USB2' line of products, and on our 'SSI2' line of products. Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

8.1 Using of a PnP ISA card

Plug and play ISA cards are a special type if ISA cards. They contain information on the name and the resources of the ISA card.

When connected for the first time, ARS Technologies software will automatically:

- Look for the resources of the card
- Redirect them with the USL
- Look for an .inf file for the ISA card and if the .inf file is found, start the “***Found New Hardware***” installation process of the operating system, and load the driver for the card.

This installation process is called only the first time. Afterward, when an ISA card and USB2ISA card are connected, the driver is automatically loaded.

No .inf file found

When connecting for the first time it is possible that **no .inf file is found** for the particular PnP ISA card. In this case, the Enumerator will bring a message box reading, “***No driver files found***”.

Clicking the “**Yes**” button will bring a file open dialog box for finding and opening the .inf file for the PnP ISA card.

is dialog box you can:

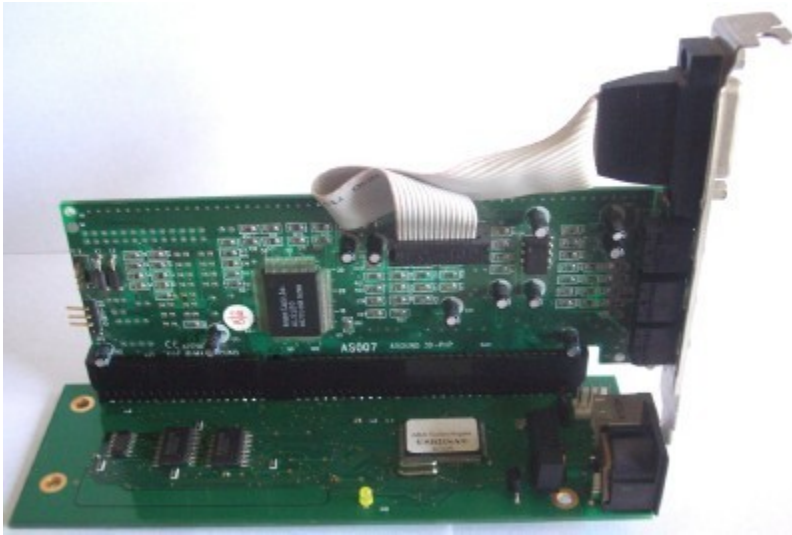
- Select driv
- e
- Double click to select directory
- Select file type, type file name
- Push open button

This will start the “***Found New Hardware***” installation process of the operating system and load the driver for the card.

Normally one PnP ISA card has multiple devices such as sound, midi, joystick, etc devices.

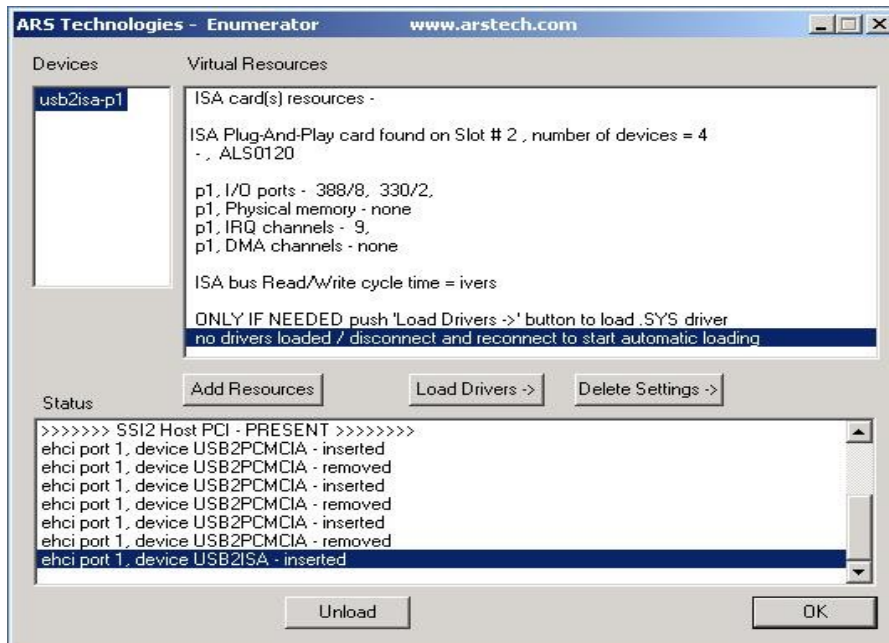
Voltages and current

A particular PnP card may need a variety of voltages and particular amounts of currents to work.



Example – PnP ISA sound card + USB2ISA-R

In the above example there is a PnP ISA sound card. The power comes from the USB cable, and the additional voltages are provided by the mounted **isa-pwr** (power supply module).



The Enumerator shows the name of the PnP ISA card, number of devices and resources detected.

8.2 Using of a standard (non PnP) ISA card

Standard (non Plug and play) ISA cards do not contain information on the name and the resources of the ISA card. These type of cards are the wide majority of ISA cards.

When connected for the first time our software will look for the resources of the ISA card, and redirect them with the USL. One ISA card may contain several devices, and each of these devices may or may not need loading of a driver.

Resources

What are the “resources”? Every ISA card has a certain range with one or more of:

- I/O port addresses
- Memory area addresses
- IRQ channels
- DMA channels

The process of looking for the resources of the ISA card may take up to 10-30 seconds, as the Enumerator goes through devices on the Plug and Play ISA cards and standard ISA cards as well.

Normally one ISA card has multiple devices, such as for example sound, midi, or joystick devices.

Voltages and current

A particular ISA card may need a variety of voltages and particular amounts of currents to work.



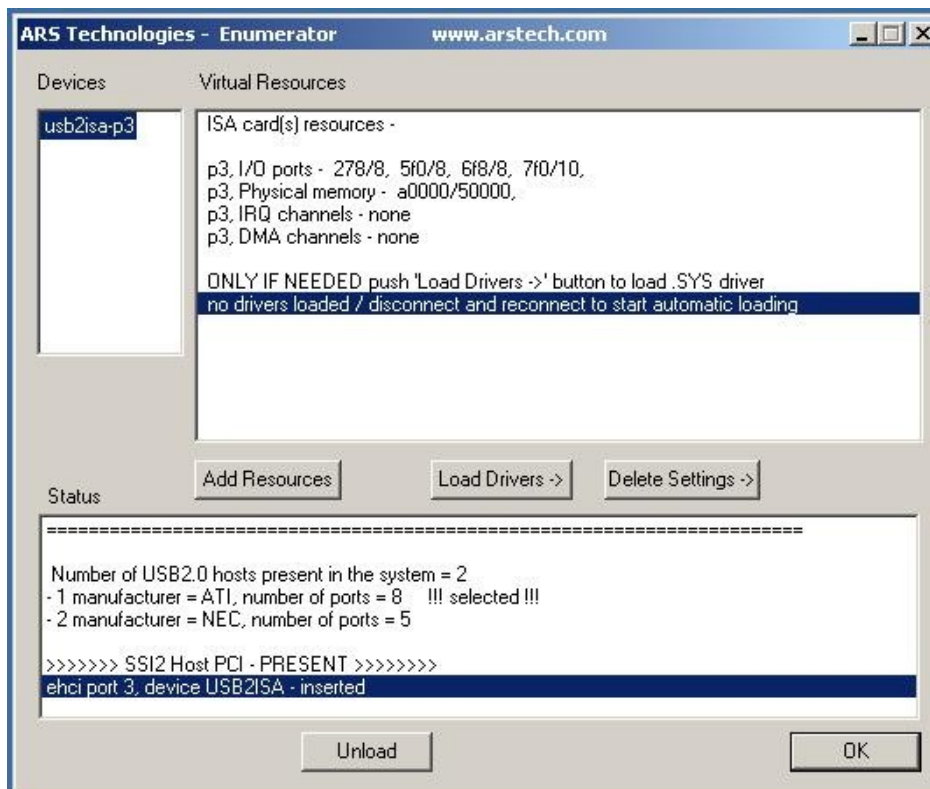
Example – standard ISA input/output card + USB2ISA-R

In the above example there is a standard ISA input/output card with two serial ports, one parallel port, one IDE and one floppy device. The power comes from the USB cable and the additional voltages are provided by the mounted **isa-pwr** (power supply module).

Manually adding resources

The process of automatically detecting resources of the Enumerator cannot handle specific ISA cards which have **hidden resources** that need to be enabled by a sequence of commands.

The Enumerator allows manually adding resources by clicking the “**Add Resources**” button in the main Enumerator window.



Manually loading drivers for a device on an ISA card

When an ISA card is mounted in USB2ISA or SSI2-ISA type of card for the first time the 'software types' dialog box comes – as described in the next chapter.

The Enumerator allows manual loading of a driver by clicking the “***Load Driver***” button in the main Enumerator window.

The .inf file of the driver needs to be modified

When connecting for the first time it is possible that no .inf file will be found for the particular ISA card. In this case the Enumerator will bring a message box that reads “***No driver files found***”.

Clicking the “**Yes**” button will bring a file open dialog box for finding and opening the .inf file for the ISA card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the “***Found New Hardware***” installation process of the operating system and load the driver for the card.

This installation process is called only the first time the ISA card and USB2ISA or SSI2-ISA card are connected. Each proceeding time, the driver loads automatically.

8.3 Software types

16bit DOS type

We deal with PCMCIA, PCI, PCI Express cards in standard well defined ways. There is no single standard way of dealing with non plug and play / standard ISA cards.

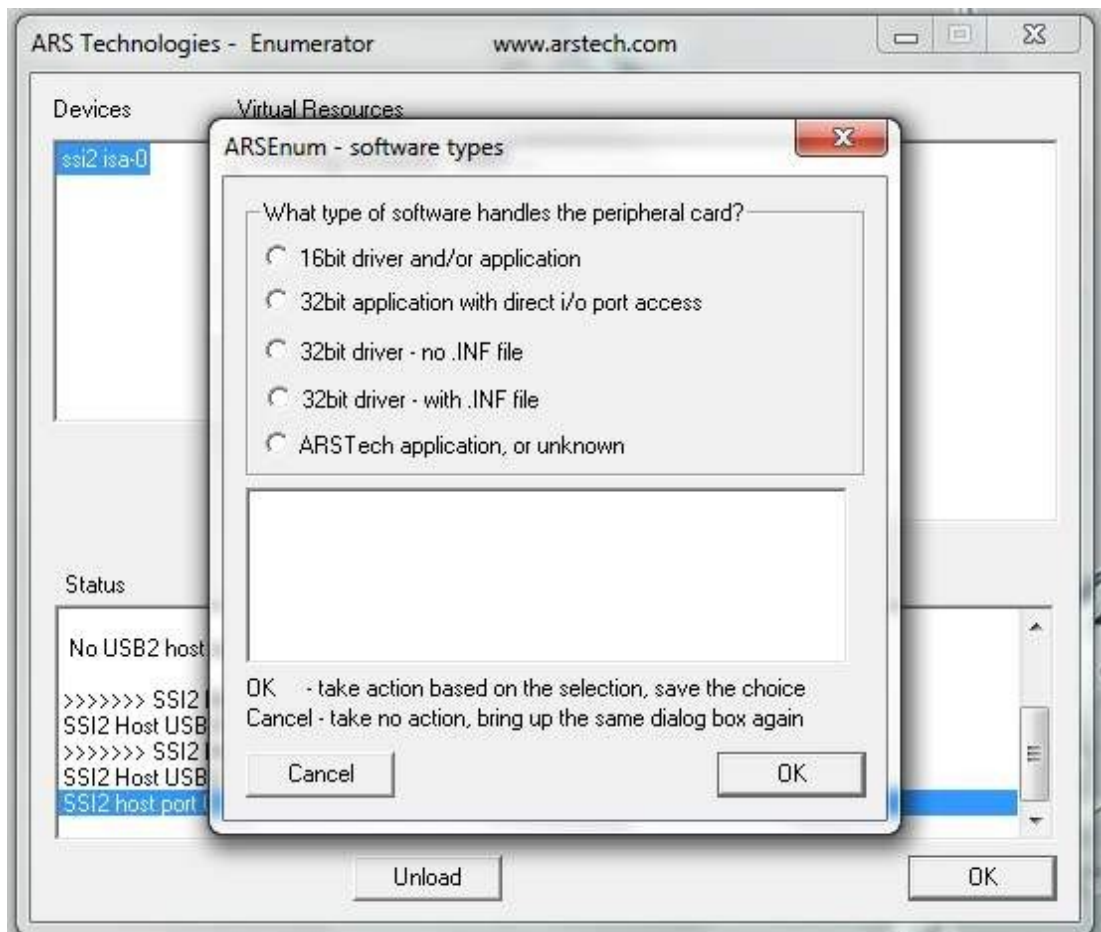
The ISA card manufacturer probably spent -

- months or years to make ISA card working on one operating system
- and then, weeks or months to make ISA card working on additional operating systems

For non standard ISA software you need to find -

- what operating system was the original ISA software working on
- was the ISA software working on the current operating system
- what software type is the ISA software

When an ISA card is mounted in USB2ISA or SSI2-ISA type of card for the first time the 'software types' dialog box comes -



The isa software can include -

- 16bit DOS type of a driver or and / or application
- 32bit Windows 98 type of an application
- 32bit Windows NT type driver - no .inf file
- 32bit Windows driver - with .inf file

Based on the above you can deal with the isa cards that you have.

If not knowing the software type for the ISA card/s software, you can push 'Cancel'. The 'software types' dialog box will come again when USB2ISA / SSI2-ISA with ISA card/s are connected.

If knowing the software type, please select it and push 'OK' button. The 'software types' dialog box will not come again, but will perform an action based on the selection.

If the ISA software is 16bit DOS type, you need to run it under our customized 'dosbox' environment.

A Windows 98 application with direct i/o ports access will crash if run on Windows 2000 and later operating system. We provide support for this type of application so that it runs normal on modern operating systems.

When having 32bit Windows NT type driver, the driver has to be in 'stopped' state after boot. Then, after connecting USB2ISA / SSI2-ISA with ISA card/s the driver has to be started.

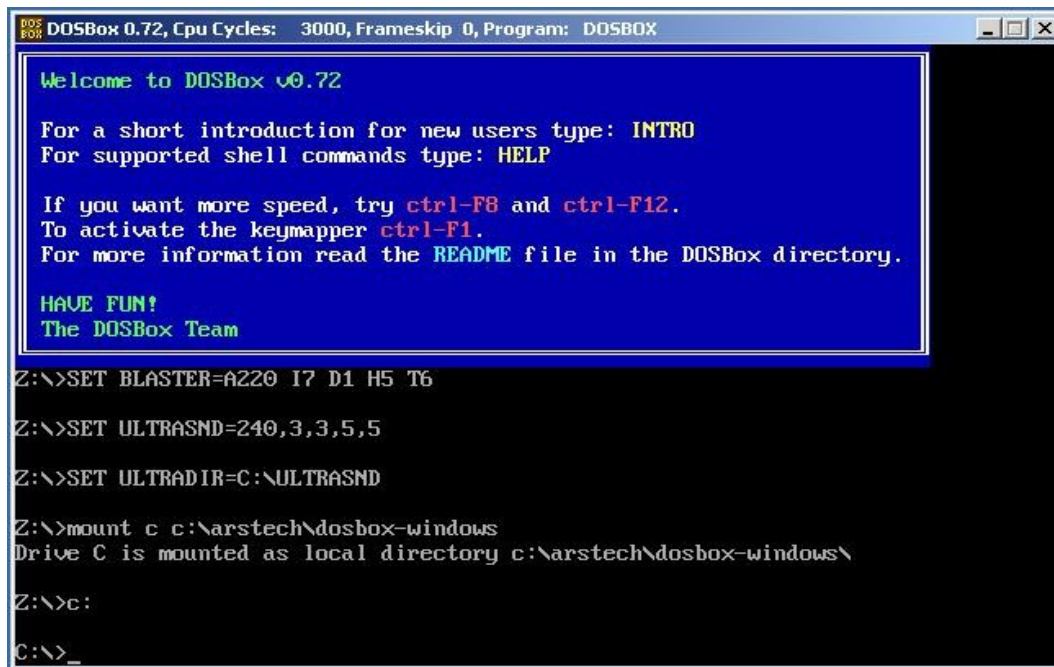
If having 32bit Windows driver - with .inf file, you need to modify the .inf file, and go through the 'Install new hardware' process to install the driver, and then load it.

When having an application built using the ARSTech API set, or the type is not known, there are no additional actions taken – the device/s on ISA card/s are handled by USL or API set.

Details on the specific steps are in the following chapters.

8.4 '16bit DOS' software type

With this selection for 'software type' the following screen comes -



```
DOSBox 0.72, Cpu Cycles: 3000, Frameskip 0, Program: DOSBOX

Welcome to DOSBox v0.72

For a short introduction for new users type: INTRO
For supported shell commands type: HELP

If you want more speed, try ctrl-F8 and ctrl-F12.
To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

HAVE FUN!
The DOSBox Team

Z:\>SET BLASTER=A220 I7 D1 H5 T6
Z:\>SET ULTRASND=240,3,3,5,5
Z:\>SET ULTRADIR=C:\ULTRASND
Z:\>mount c c:\arstech\dosbox-windows
Drive C is mounted as local directory c:\arstech\dosbox-windows\
Z:\>c:
C:\>
```

After opening the main dosbox window, you will need to select the location of the DOS software.

If, for example, the DOS software is placed in the “**dosprog**” folder, please type:

mount c c:\dosprog

Then type:

c:

DOS drivers

If the ISA DOS software includes a driver, you need to load it in advance.

A utility DEVLOAD - provides a method of loading device drivers from the command line under MS-DOS, rather than having to re-boot in order to load extra drivers. It is freeware, available on -

[ftp://ftp.infradead.org/pub/devload/devload.exe](http://ftp.infradead.org/pub/devload/devload.exe)

Then you can run the main ISA DOS application.

Windows 3.1 / 3.11 ISA software

The ISA software may have been running on Windows 3.1 or 3.11 operating systems.

Such software may be handled under our 'dosbox' environment.

The initial step is to install Windows 3.1 (or 3.11), as follows -

- make folders in the dosbox directory for each install disk,
- then in the 'dosbox' window (after mounting 'dosbox direcotry' as C) go to the first folder and start **setup**,
- select to do custom setup so you could tell where each disk folder location is (7 total)

After installation, if mouse doesn't work - shut down dosbox (and as a precaution unload and restart the enumerator).

The location of the dosbox is in the following folder -

\windows\inf

When you start 'dosbox', mount the drive, go to windows folder, and type -

win

the windows 3.1 / 3.11 starts, and mouse is working.

You may need to install additional packages required by the isa software.

There is additional information available, listed when doing a Google search for -

windows 3.1 dosbox

After installing all software needed, and having USB2/SSI2 ISA , while in Windows 3.1 , the ISA board/s is found and working.

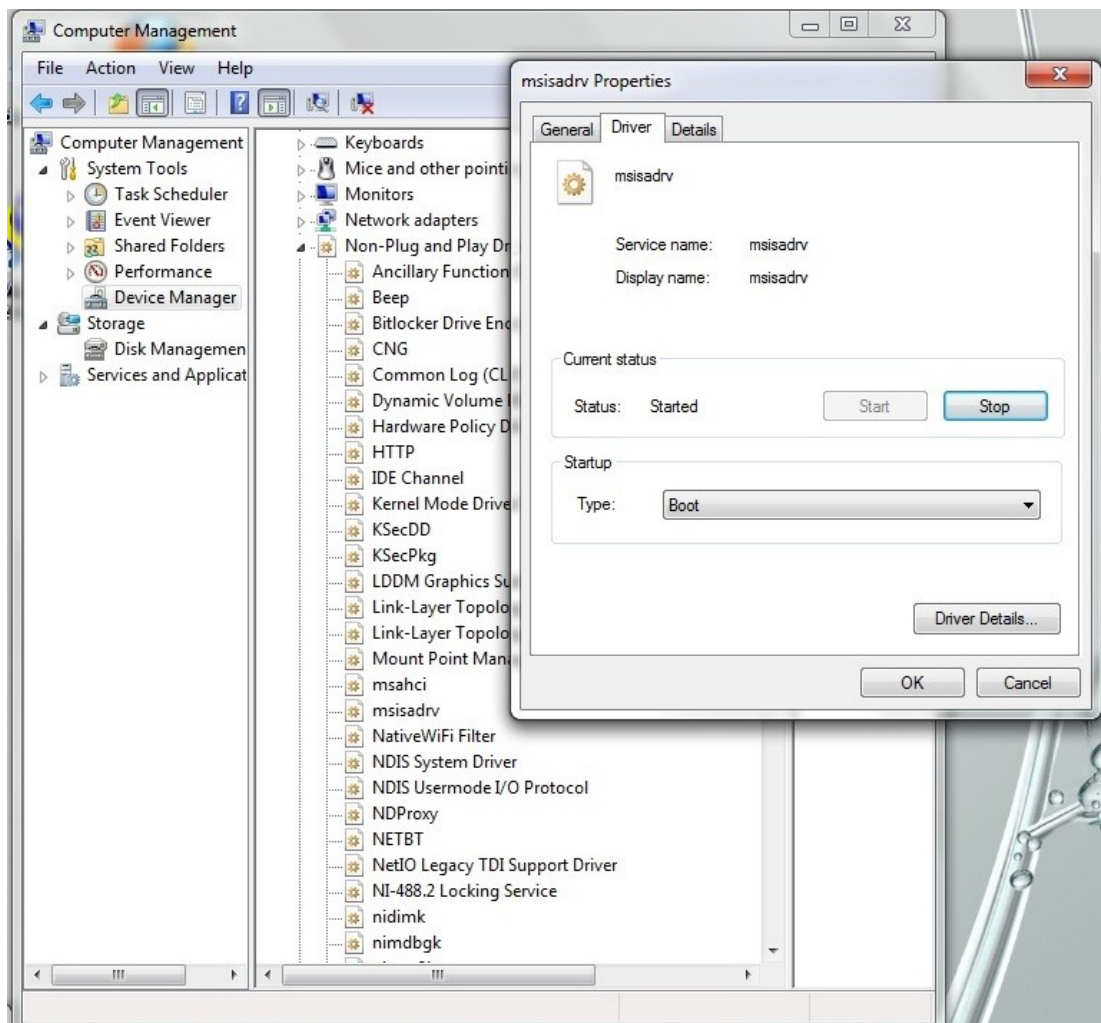
8.5 '32bit Windows NT type driver - no .inf file' software type

With this selection for 'software type' the driver has to be in 'stopped' state after boot. The procedure is -

- connect usb2isa / ssi2-isa + isa
- do 'start' on isa driver
- run the isa application

You can do start / stop by -

- In 'computer management' -> 'device manager' -> 'view' ,
 - check 'show hidden devices'
 - enlarge 'non plug and play drivers'
 - select the particular isa driver – for ex. 'msisadv'
- (normally the listed device for ex. 'abc' is based on the driver name 'abc.sys')
- double click on the 'msisadv' device , select 'driver' tab



The above screen shows the way of 'stop'/'start'.

An alternative way of start / stop is to type from command line -

```
net start msisadv
```

```
net stop msisadv
```

The Enumerator attempts to do automatically the stop / start process, however you may need to make additional checks to find what the current state of the Windows NT type driver is, and do start / stop in 'device manager' or from command line.

8.6 '32bit Windows type driver - with .inf file' software type

The original installation software disk for an ISA card (on a floppy or a CD) contains the .inf installation files and hold the drivers for the devices on a particular ISA card.

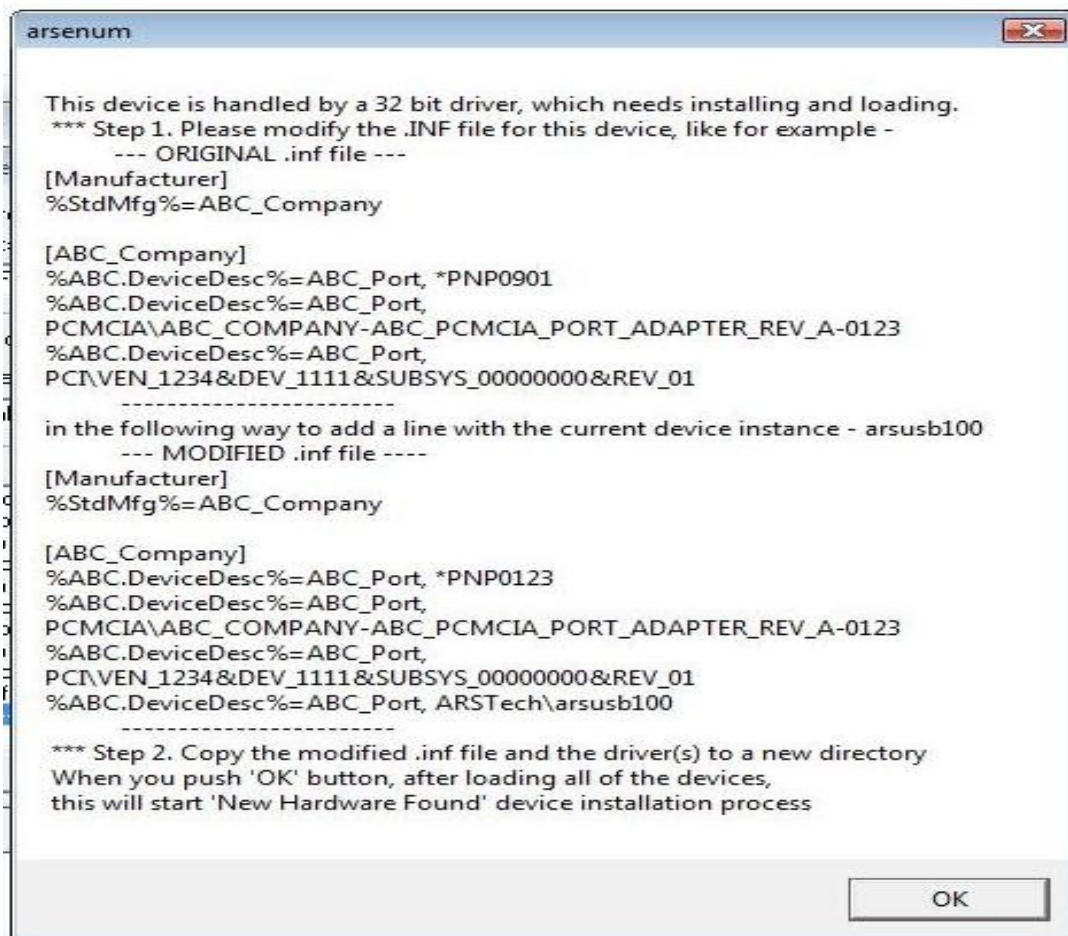
The .inf installation files for the different devices need to be modified manually in order to install and load drivers for a device on an ISA card mounted to a USB2ISA and SSI2-ISA.

Modifying .inf files

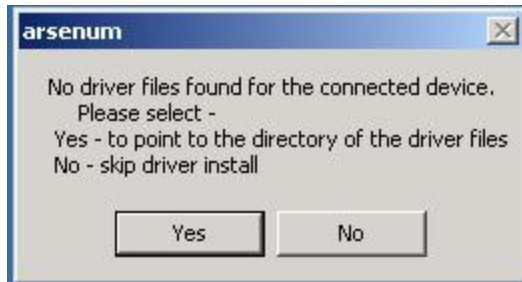
With selection of '32bit Windows type driver - with .inf file' a message box appears with the current device instance.

9

To modify the .inf file, please pay careful attention to the message box which will give you the current device instance- for example, **arsusb100** , **arsusb101**, ... or **PCI\VEN_0010&DEV_0064**, **PCI\VEN_0010&DEV_0065** ... etc, and the location where the modification is made. Please refer to next chapters for examples of modified .inf files.



The Enumerator will bring next a message box as shown below:



ARSTech Enumerator –no driver files found message

Clicking the “**Yes**” button will bring a file open dialog box for finding and opening the .inf file for the PCMCIA card.

In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the “***Found New Hardware***” installation process of the operating system and load the driver for the card.

8.7 Example of a modified .INF file for installing

An example of a modified .inf file for Windows 2000, XP, Server 2003, Vista ,Server 2008 and 7 operating systems is shown bellow.

The example provided is for reference purposes only. You will need to:

5. Identify the [Manufacturer] section,
6. Add a line with the particular device instance
7. Save the file – preferably under a new name
8. Point to this file – when needed

The example below adds a line with the device instance for example - **ARSTech\arsusb102**

```
-----
;
; Copyright (c) ARS Technologies - All rights Reserved
;
; Module Name:
;
;     arswdm2kxp.INF
;
; Abstract:
;     INF file for installing of a sample wdm driver :
;
;     operating systems - Windows 2000, XP, Server 2003, Vista, Server 2008
;

[Version]
Signature="$WINDOWS NT$"
Class=Sample
ClassGuid={78A1C341-4539-11d3-B88D-00C04FAD5171}
Provider=%ARS%

[DestinationDirs]
DefaultDestDir = 12

; ===== Class section =====
[ClassInstall32]
Addreg=SampleClassReg

[SampleClassReg]
HKR,,,0,%ClassName%
HKR,,Icon,,-5

; ===== Device Install section =====
[Manufacturer]
%ARS%=ARS

[SourceDisksFiles]
arswdm1.sys=1

[SourceDisksNames]
1=%DISK_NAME%,

[ARS]
; DisplayName          Section          DeviceId
; -----
%ARSwdm1.DRVDESC%=ARSwdm1_Inst,root\ARSwdm1
; !!! modified here !!!
%ARSwdm1.DRVDESC%=ARSwdm1_Inst,ARSTech\arsusb102
```

```
[ARSwdml_Inst.NT]
CopyFiles=ARSwdml.CopyFiles

[ARSwdml.CopyFiles]
arswdml.sys

[ARSwdml_Inst.NT.Services]
AddService=ARSwdml,0x00000002,ARSwdml_Service

[ARSwdml_Service]
DisplayName      = %ARSwdml.SVCDESC%
ServiceType      = 1                ; SERVICE_KERNEL_DRIVER
StartType        = 3                ; SERVICE_DEMAND_START
ErrorControl     = 1                ; SERVICE_ERROR_NORMAL
ServiceBinary    = %12%\arswdml.sys

[Strings]
ARS = "ARS Technologies"
ClassName = "ARS Technologies Sample Drivers"
ARSwdml.SVCDESC = "ARS Technologies Sample wdm Service"
ARSwdml.DRVDESC = "ARS Technologies Sample wdm Driver"
DISK_NAME = "ARS Technologies Sample Install Disk"
-----
```

9. PCMCIA cards - use

This chapter describes the way of use of PCMCIA cards on our 'USB2' line of products, on our 'SSI2' line of products, and on our 'XPRS' line of products.

Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

The PCMCIA interface supports 2 types of cards -

- 16bit , 'PC Card' type
- 32bit , 'CardBus' type

If you have 16bit card you can use - our USB2PCMCIA product, or our SSI2-PCMCIA product.

16bit PCMCIA cards can be powered by either 3.3V or +5V power to work. Some cards can use either one or the other voltage.

If a PCMCIA card requires +5V for powering, it can be handled only by USB2PCMCIA product, because our SSI2-PCMCIA product uses only 3.3V.

If you have 32bit card you can use - our SSI2-PCMCIA product, or our XPRS-CB product.

When connected for the first time, ARS Technologies software will automatically:

- Look for the resources of the card
- Redirect them with the USL (do not apply to XPRS-CB)
- Look for an .inf file for the PCMCIA card and if the .inf file is found, start the *"Found New Hardware"* installation process of the operating system, and load the driver for the card.

This installation process is called only the first time the PCMCIA card and our USB2PCMCIA, SSI2-PCMCIA, or XPRS-CB device are connected. In proceeding, the drivers load automatically.

Devices

Normally a PCMCIA card has one device such as a modem, a network device...

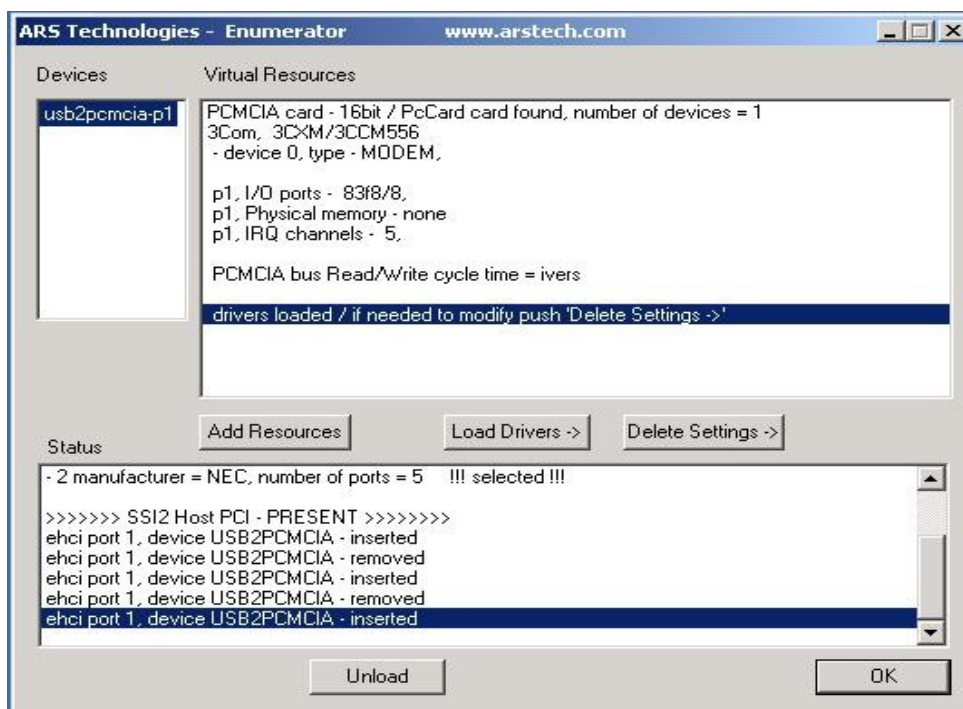
There are cases where a PCMCIA card has two devices such as a modem and network device. In this case, each device has to have separate .inf install. files and driver files.

The results of the driver loading are shown in 2 places -

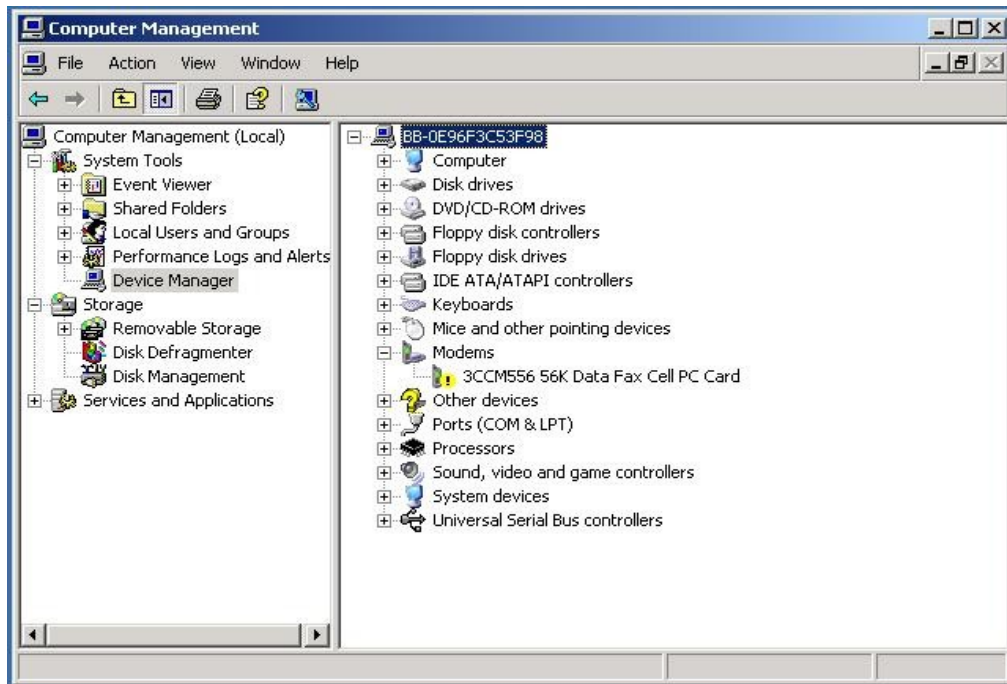
- in the Enumerator
- in the 'Device manager'

Enumerator shows the:

- Name of the card
- Number of devices and their type
- Resources used



The 'Device Manager' will show a driver loaded, based on the type of a device.



When connecting for the first time, it is possible that there will be **no .inf file found** for the particular PCMCIA card. In this case the Enumerator will bring a message box reading *“No driver files found”*.

Clicking the “Yes” button will bring a file open dialog box for finding and opening the .inf file for the PCMCIA card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the *“Found New Hardware”* installation process of the operating system, and load the driver for the card.

Examples -



16bit PCMCIA modem card + USB2PCMCIA



32bit PCMCIA network card + SSI2 PCMCIA



32bit PCMCIA network card + XPRS-CB

10. PCI cards - use

This chapter describes the way of use of PCI cards on our 'SSI2' line of products, and on our 'XPRS' line of products.

Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

When connected for the first time, the ARS Technologies software will automatically:

- Look for the resources of the card
- Redirect them with the USL (do not apply to XPRS-PCI-..)
- Look for an .inf file for the PCI card and if the .inf file is found
- Start the '*Found New Hardware*' installation process of the operating system, and load the driver for the card.

This installation process is called only the first time the PCI card and SSI2-PCI / XPRS-PCI-.. are connected. Afterward, the driver is loaded automatically.

When connecting for the first time, it is possible that there will be no .inf file found for the particular PCI card. In this case the Enumerator will bring a message box that reads "*No driver files found*".

Clicking the "Yes" button will bring a file open dialog box for finding and opening the .inf file for the PCI card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

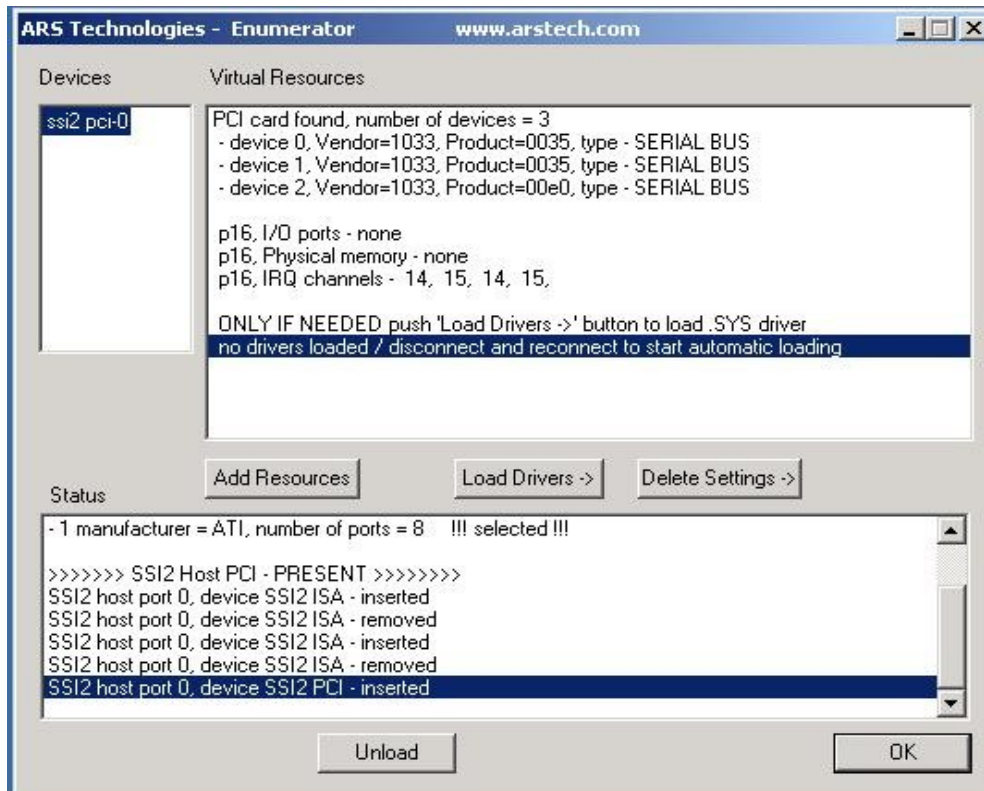
This will start the "*Found New Hardware*" installation process of the operating system and then load the driver for the card.

Devices

One PCI card may have one device, for example modem device, or a network device. There are cases where a PCI card has multiple devices. In this case each device has to have separate .inf install. files and driver files.

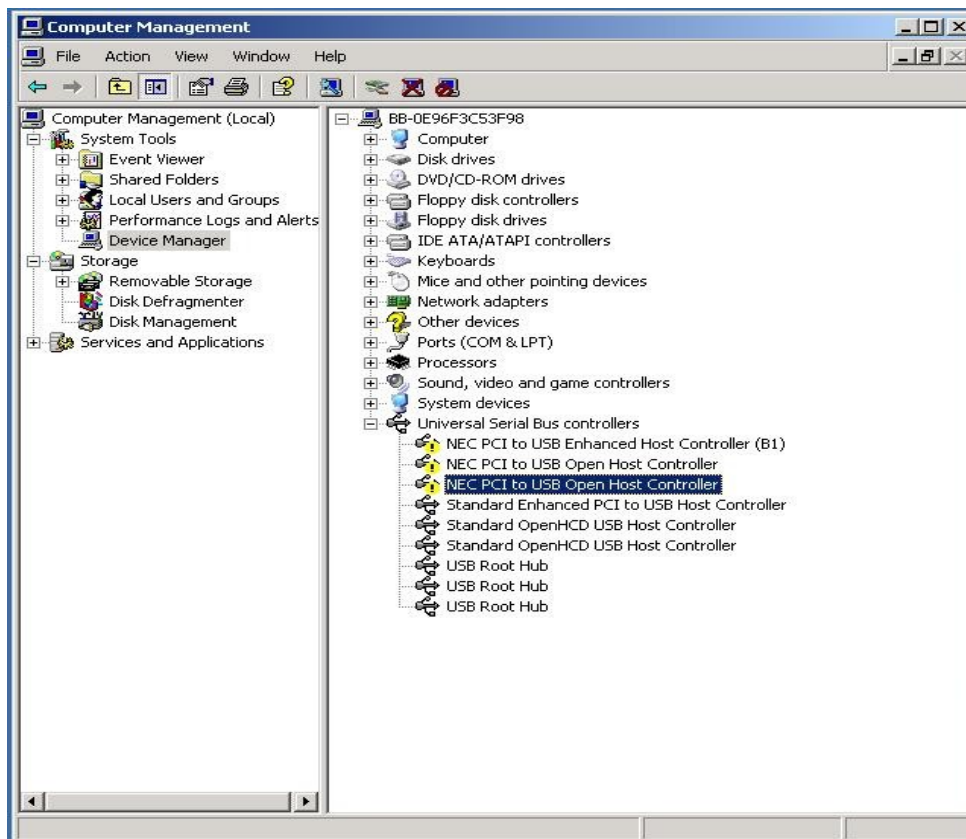
The results of the driver loading are shown in 2 places -

- in the Enumerator
- in the 'Device manager'



The Enumerator shows the:

- Vendor/Product ID of the card
- Number of devices and their type
- Resources used

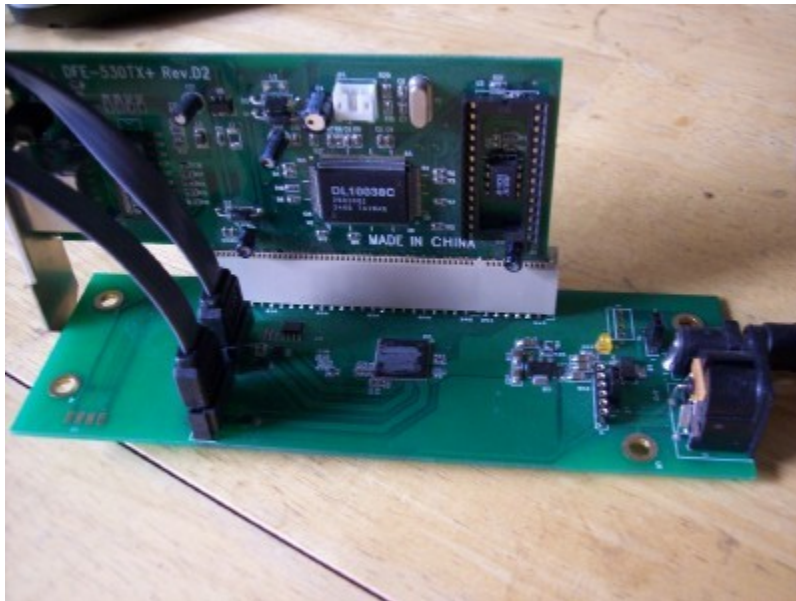


The 'Device Manager' will show drivers loaded for the USB host devices.

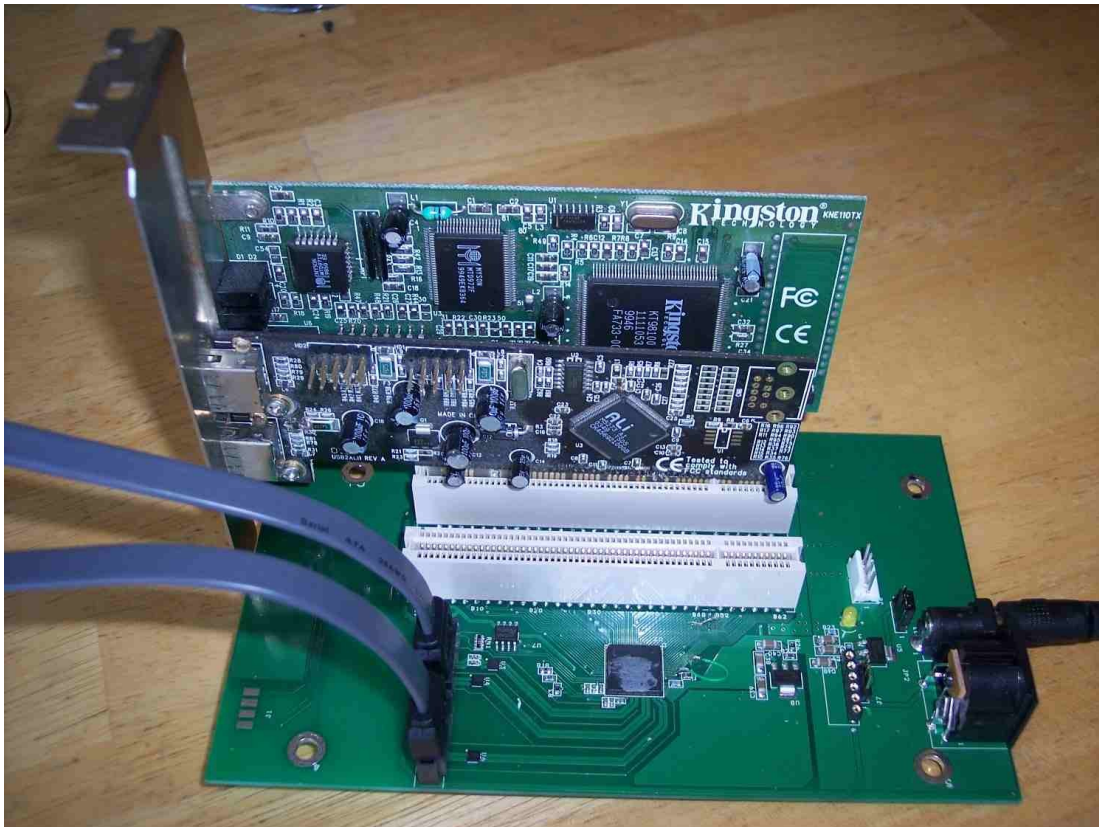
Example



PCI USB2.0 host card + SSI2 PCI



PCI network card + XPRS-PCI-X1



2 PCI cards + XPRS-PCI-X3

11. PCI Express -x1 and -x16 cards - use

This chapter describes the way of use of PCI Express -x1/-x16 cards on our 'XPRS' line of products.

Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

When connected for the first time, the ARS Technologies software will automatically:

- Look for the resources of the card
- Look for an .inf file for the PCI Express -x1/-x16 card and if the .inf file is found
- Start the '*Found New Hardware*' installation process of the operating system, and load the driver for the card.

This installation process is called only the first time the PCI Express -x1/-x16 card and XPRS-PX-.. are connected. Afterward, the driver is loaded automatically.

When connecting for the first time, it is possible that there will be no .inf file found for the particular PCI Express -x1/-x16 card. In this case the Enumerator will bring a message box that reads “*No driver files found*”.

Clicking the “**Yes**” button will bring a file open dialog box for finding and opening the .inf file for the PCI card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the “*Found New Hardware*” installation process of the operating system and then load the driver for the card.

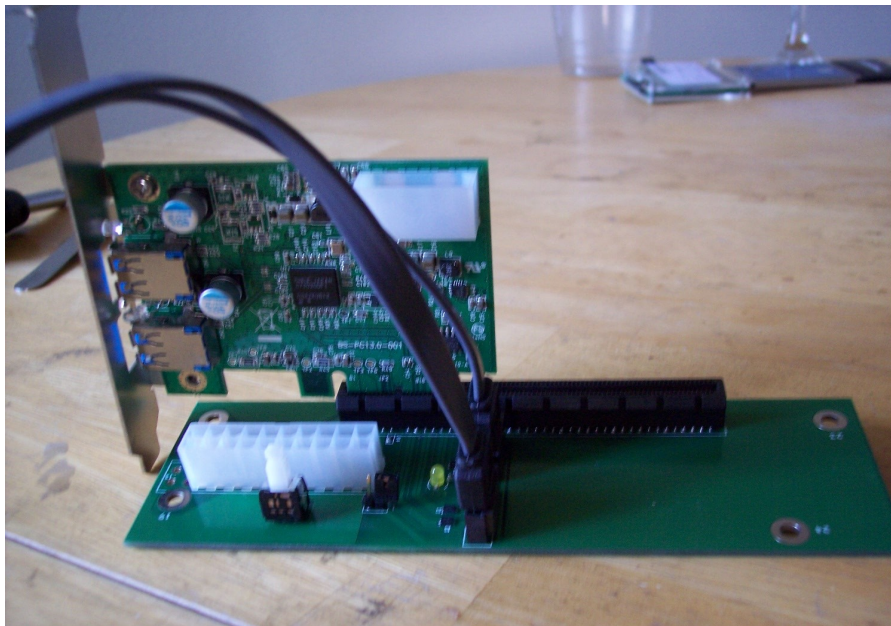
Devices

One PCI Express -x1/-x16 card may have one device, for example video device, or a network device. There are cases where a PCI Express -x1/-x16 card has multiple devices. In this case each device has to have separate .inf install. files and driver files.

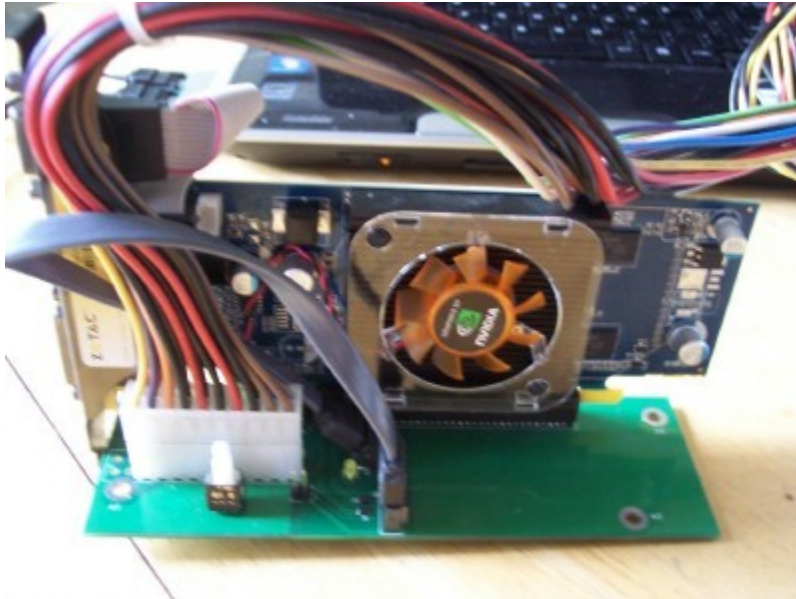
Examples



PCI Express -x1 card mounted in XPRS-PX-X1



PCI Express -x1 card mounted in XPRS-PX-X16



PCI Express -x16 card mounted in XPRS-PX-X16

12. ExpressCard type34 and type54 cards - use

This chapter describes the way of use of ExpressCard type34/type54 cards on our 'XPRS' line of products.

Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

When connected for the first time, the ARS Technologies software will automatically:

- Look for the resources of the card
- Look for an .inf file for the ExpressCard type34/type54 card and if the .inf file is found
- Start the '*Found New Hardware*' installation process of the operating system, and load the driver for the card.

This installation process is called only the first time the ExpressCard type34/type54 card and XPRS-EC are connected. Afterward, the driver is loaded automatically.

When connecting for the first time, it is possible that there will be no .inf file found for the particular ExpressCard type34/type54 card. In this case the Enumerator will bring a message box that reads “*No driver files found*”.

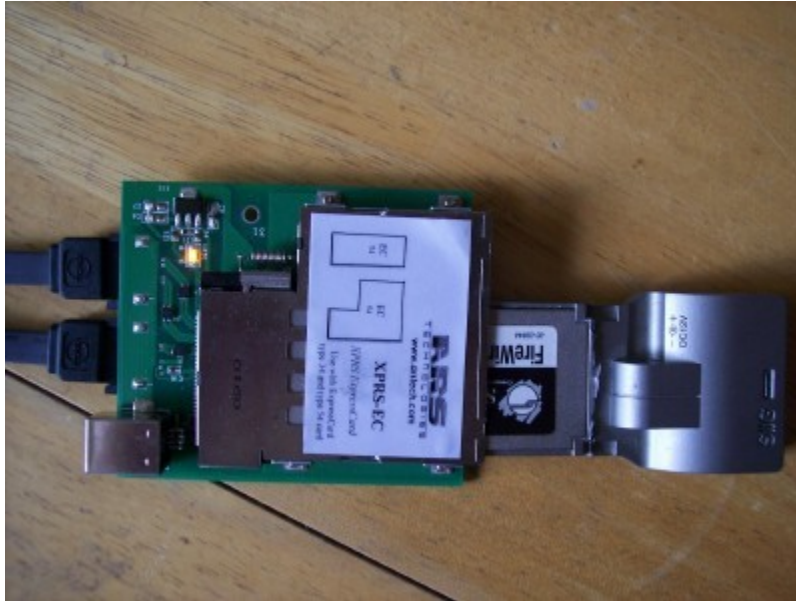
Clicking the “**Yes**” button will bring a file open dialog box for finding and opening the .inf file for the PCI card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the “*Found New Hardware*” installation process of the operating system and then load the driver for the card.

Devices

One ExpressCard type34/type54 card may have one device, for example 1394 device, or a network device. There are cases where a ExpressCard type34/type54 card has multiple devices. In this case each device has to have separate .inf install. files and driver files.

Examples

ExpressCard type34 1394 card + XPRS-CB

13. Compact PCI Express and PXI Express cards - use

This chapter describes the way of use of Compact PCI Express and PXI Express cards on our 'XPRS' line of products.

Information on the specific product, the way of connecting, powering, enclosures, etc. is available in the chapters 1-3 .

When connected for the first time, the ARS Technologies software will automatically:

- Look for the resources of the card
- Look for an .inf file for the Compact PCI Express and PXI Express card and if the .inf file is found
- Start the '*Found New Hardware*' installation process of the operating system, and load the driver for the card.

This installation process is called only the first time the Compact PCI Express and PXI Express card and XPRS-cPCIe are connected. Afterward, the driver is loaded automatically.

When connecting for the first time, it is possible that there will be no .inf file found for the particular Compact PCI Express and PXI Express card. In this case the Enumerator will bring a message box that reads "***No driver files found***".

Clicking the "Yes" button will bring a file open dialog box for finding and opening the .inf file for the PCI card. In this dialog box you can:

- Select drive
- Double click to select directory
- Select file type
- Type file name
- Push open button

This will start the "***Found New Hardware***" installation process of the operating system and then load the driver for the card.

Devices

One Compact PCI Express and PXI Express card may have one device, for example a DAQ device. There are cases where a Compact PCI Express and PXI Express card has multiple devices. In this case each device has to have separate .inf install. files and driver files.

Examples



PXI Express DAQ card + XPRS-cPCIe

Appendix

A. SSI2 host support for desktop computers

ARS Technologies SSI2 line of products allow work with a SSI2 host controller.



SSI2 Host PCI card mounted in a desktop computer

The SSI2 Host PCI card is added on a PCI slot in a desktop computer.

The SSI2 host controller support will work with ARS Technologies products in the same way under all of the Microsoft's operating systems we support (Windows 98, ME, 2000, XP, Server 2003, Vista and Server 2008, 7).

B. SSI2 host support for notebook computers

ARS Technologies SSI2 line of products allow work with a SSI2 host.



SSI2 Host CB card mounted in a notebook computer

The SSI2 Host CB card is added on a 'Card Bus' slot in a notebook computer which has a PCMCIA slot supporting 'Card Bus' PCMCIA cards.

The SSI2 Host EC card is added on a 'ExpressCard' slot in a notebook computer which has an 'ExpressCard' slot.

The way of mounting is the same as shown on the above image.

One important detail is that the card - SSI2 Host CB or SSI2 Host EC has to be powered by the **pwr-5v** adapter before being plugged into the notebook.

The SSI2 host controller support will work with our products in the same way under all of the Microsoft's operating systems we support – Windows 98, ME, 2000, XP, Server 2003, Vista, Server 2008.

C. Uniform DOS support

Introduction

DOS is an operating system used primarily 15-25 years ago. There is still hardware in the industrial, embedded, scientific, medical fields that use DOS.

ARS Technologies provides uniform support for software written for DOS operating system, servicing ISA and PCMCIA cards used with our USB2ISA and USB2PCMCIA products under today's popular operating systems.

DOS software can be used under variety of modern operating system using DOS emulators. ARS Technologies chose to use the DOSBOX emulator because it is open source and supports a wide number of operating systems.

Builds

ARS Technologies currently provides builds for Windows and Linux operating systems.

An end user can copy the files from the “**builds-windows**” folder and start using their DOS software with our products like the USB2ISA and ISA cards, for example.

Prerequisites

In order to use the binaries of the dosbox builds, the ARS Technologies software must be installed and our Enumerator must be running.

Developer support and sources

ARS Technologies provides the sources of the dosbox files we modify, as well as our object files for different environments.

Details on the sources are included in the **readme.txt** file in the “/src” folder.

The included files are released under the condition of use exclusively with the hardware and software products of ARS Technologies.

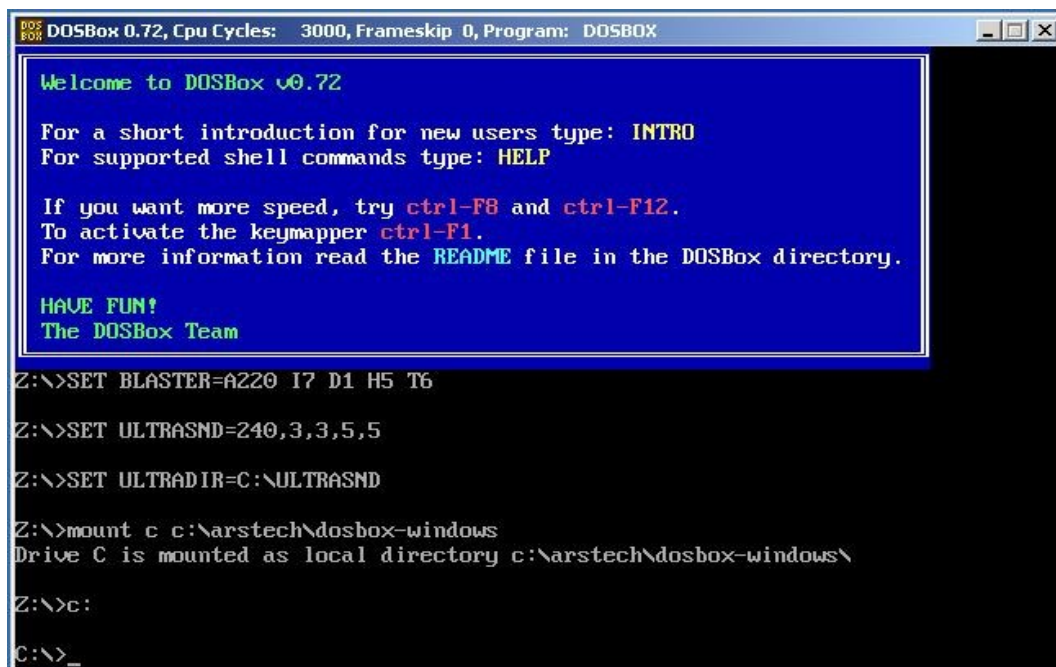
A developer may use the included files, modify them if needed and make their own dosbox build.

Use

There are two main modes in the ARS Technologies dosbox builds:

- **Standard mode** - started from terminal/command line with **dosbox** doubleclick on the dosbox.exe file

This mode brings one screen only, and has the maximum possible performance.

A screenshot of a DOSBox 0.72 window. The title bar reads "DOSBox 0.72, Cpu Cycles: 3000, Frameskip 0, Program: DOSBOX". The main window has a blue background with white text. It displays a welcome message: "Welcome to DOSBox v0.72", followed by instructions: "For a short introduction for new users type: INTRO", "For supported shell commands type: HELP", "If you want more speed, try ctrl-F8 and ctrl-F12.", "To activate the keymapper ctrl-F1.", and "For more information read the README file in the DOSBox directory." It then says "HAVE FUN!" and "The DOSBox Team". Below this, a command prompt shows several commands being entered: "Z:\>SET BLASTER=A220 I7 D1 H5 T6", "Z:\>SET ULTRASND=240,3,3,5,5", "Z:\>SET ULTRADIR=C:\ULTRASND", "Z:\>mount c c:\arstech\dosbox-windows", and "Drive C is mounted as local directory c:\arstech\dosbox-windows\". The prompt then shows "Z:\>c:" and "C:\>_".

```
DOSBox 0.72, Cpu Cycles: 3000, Frameskip 0, Program: DOSBOX

Welcome to DOSBox v0.72

For a short introduction for new users type: INTRO
For supported shell commands type: HELP

If you want more speed, try ctrl-F8 and ctrl-F12.
To activate the keymapper ctrl-F1.
For more information read the README file in the DOSBox directory.

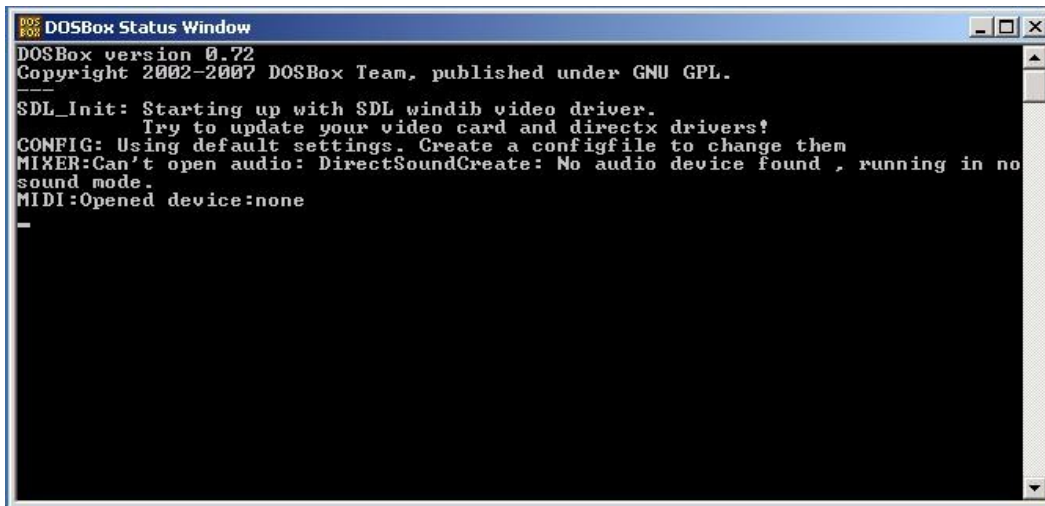
HAVE FUN!
The DOSBox Team

Z:\>SET BLASTER=A220 I7 D1 H5 T6
Z:\>SET ULTRASND=240,3,3,5,5
Z:\>SET ULTRADIR=C:\ULTRASND
Z:\>mount c c:\arstech\dosbox-windows
Drive C is mounted as local directory c:\arstech\dosbox-windows\
Z:\>c:
C:\>_
```

- **Debug mode** - started from terminal/command line with **dosbox b**

This mode provide two screens. The second screen brings up status debug messages when connecting / disconnecting / accessing ARS Technologies products.

This mode is recommended for testing purposes only. Displaying reduces performance.



Connecting / disconnecting

When using the dosbox in debug mode, connecting / disconnecting events of the ISA, PCI and PCMCIA cards, on USB2ISA/USB2PCMCIA or SSI2 ISA, SSI2 PCI and SSI2 PCMCIA cards are registered on the debug window.

In addition, the connecting event shows the detected resources.

The process of auto detection is not always precise. There may be a need to add resources.

To do this please check our user's guide on the particular environment for adding resources in the ARSTech Enumerator.

Running DOS software

After opening the main dosbox window, you will need to select the location of the DOS software.

If, for example, the DOS software is placed in the “**dosprog**” folder, please type:

on Windows enviroment
mount c c:\dosprog

Then type:

c:

and run the DOS software

If the ISA DOS software includes a driver, you need to load it in advance. A utility DEVLOAD - provides a method of loading device drivers from the command line under MS-DOS, rather than having to re-boot in order to load extra drivers. It is freeware, available on - <ftp://ftp.infradead.org/pub/devload/devload.exe>

Then you can run the main ISA DOS application.

Utilities

There is currently one DOS utility included with the install software- **tst16.exe**.

Resources access

The utility allows read / write capabilities to I/O ports and memory areas.

Please note that the address range for I/O ports is 0 to ffff, having the most widely used area of 0 to 3ff in hex addresses.

The address range for memory area is 0 to ffffff, with the most widely used area of b000 to fffff in hex addresses. This is a “memory hole” where some hardware peripheral cards and the system's BIOS are located.

Tests

The **tst16** utility includes two tests:

- Serial port
- Disk tests

Both tests require an ISA card which includes one of the following:

- rs232/rs422/rs485 serial ports
- ata/atapi ide disk controller

Please follow the prompts to select I/O ports and IRQ channel.

ARS Technologies recommends using dosbox in the debug mode, and check the debug screen for the actual DOS accesses.

Please note that selected IRQ channels must be free and available for use. While use of the IRQ 3/4 may be allowed, if the serial ports on a system's motherboard are not present or used, the use of IRQ 14/15 will interfere with the use of the system's motherboard IDE controller.

